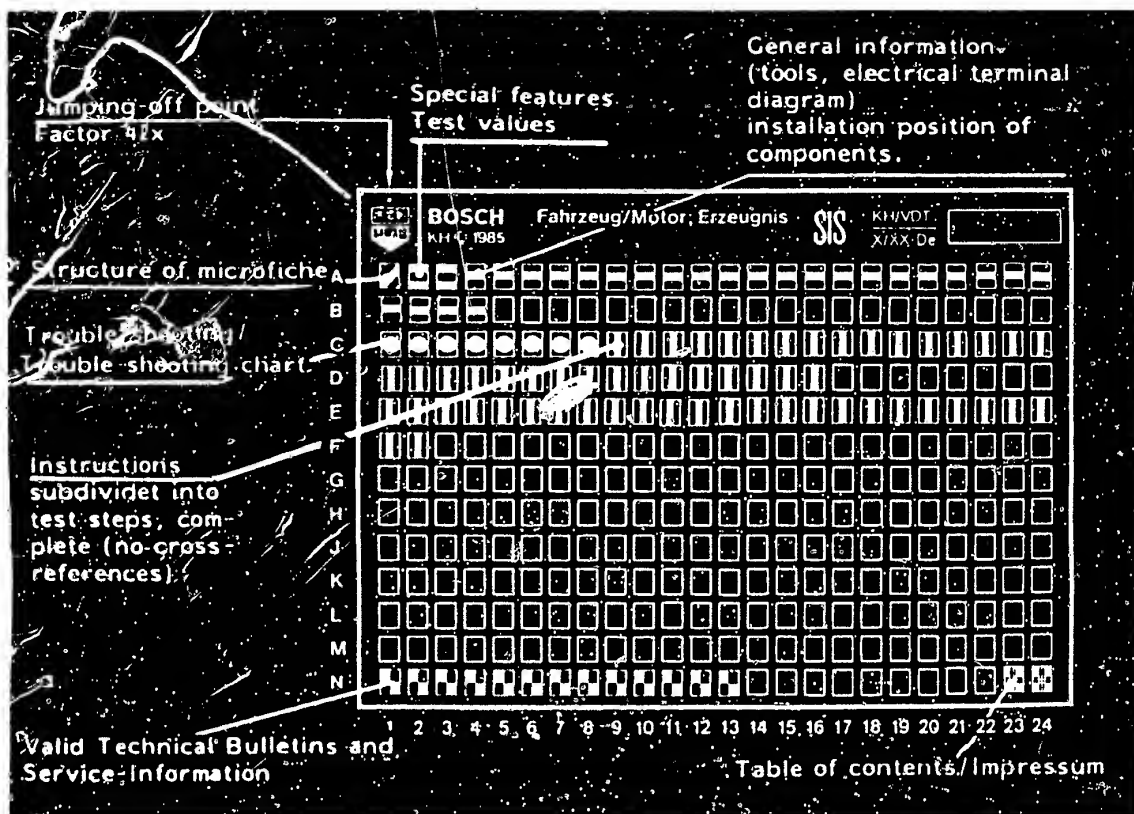


## Structure of microfiche

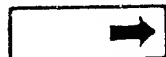


1. Read from left to right
2. Title of microfiche (appears on each coordinate)

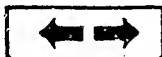
<b>E16</b>	Product/component/test step
	Vehicle/engine

Coordinate

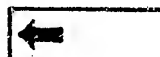
3. Limits of section



Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6



<b>A1</b>	Trouble-shooting program	
-----------	--------------------------	--

## 1. Special features

Porsche 928 S USA (4-valve) as of 10.84 equipped with  
Trigger box 0 227 100 124 (with current limitation)  
Ignition coil 0 221 118 322  
EZ (electronic-  
ignition) control  
unit 0 227 400 013

## 2. Test specifications

Ignition coil, primary 0.4...0.7  $\Omega$

**C11**

Ignition coil, secondary 4.9...8.7 k $\Omega$

Engine-temperature  
sensor

**C15**

Resistance at 0°C 4.4...6.8 k $\Omega$   
coolant tem-  
perature: +15...30°C 1.4...3.6 k $\Omega$

+40°C 0.9...1.3 k $\Omega$

+60°C 480...720  $\Omega$

+80°C 250...390  $\Omega$

Intake-air temperature sensor

**C17**

Resistance at 0°C 4.4...6.8 k $\Omega$   
ambient tem- +15...30°C 1.4...3.6 k $\Omega$   
perature: +40°C 0.9...1.3 k $\Omega$   
+60°C 480...720  $\Omega$   
+80°C 250...390  $\Omega$

Ignition timing 7...13° BTCD  
with engine at idle speed  
(between 650...920 min<sup>-1</sup>)

**C15**

To prevent incorrect measure-  
ments, test must be per-  
formed as described on  
Coordinates given on right.



**D9**

Trigger box power supply  
with engine idling 12...14 V

**D13**

**A2**

Special features, test specifications  
Porsche



Power supply to ignition coil  
with engine idling

$\geq 10 \text{ V}$

**D13**

Primary voltage  
with engine idling

295...365 V

**D15**

Internal resistance of  
engine-speed and reference-  
mark sensor

0.6...1.6 k $\Omega$

**E11**

Voltage at engine-speed and  
reference-mark sensor  
at cranking speed

$\approx 2.5 \text{ V}$

**E15**

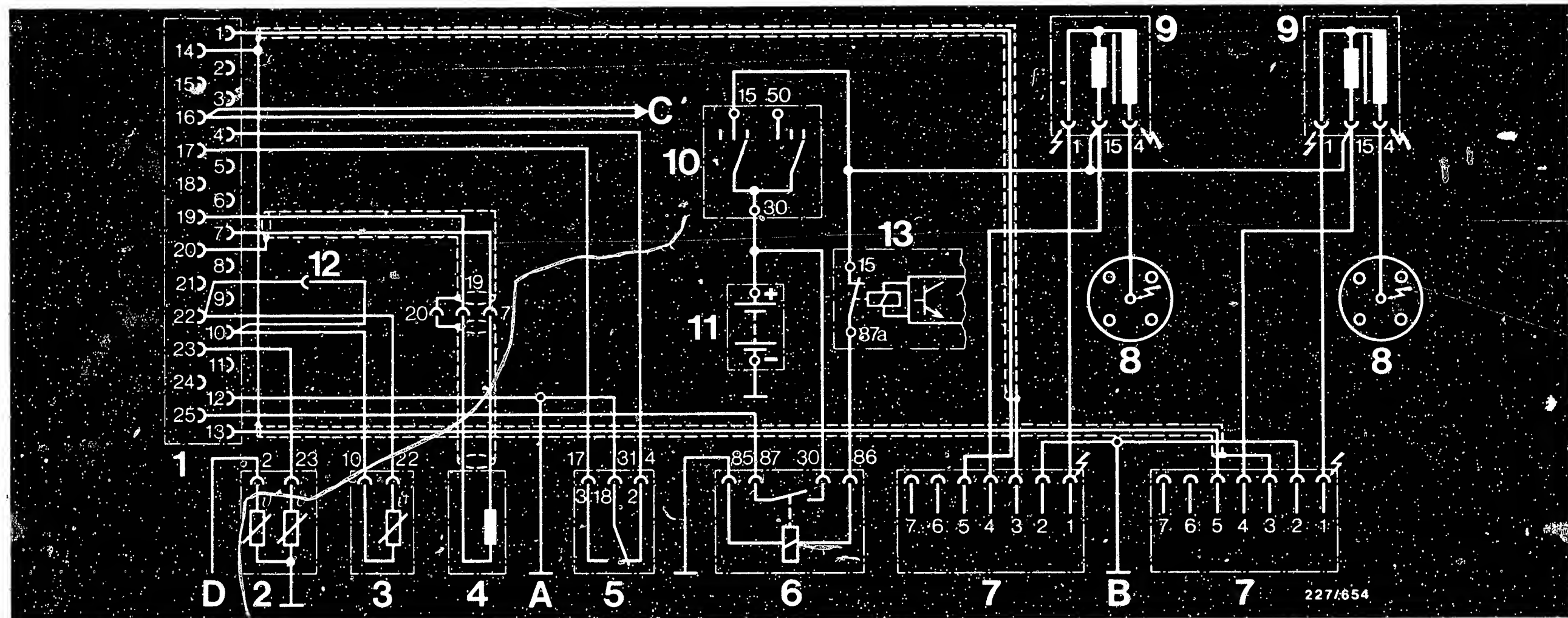
See Autodata test specifications for settings for  
exhaust etc.

**A3**

Test specifications

Porsche





Danger arrows: Warning: 400 V ... 25 kV

- 1 = EZ control unit
- 2 = Engine-temperature sensor (double NTC)
- 3 = Intake-air temperature sensor
- 4 = Engine-speed and reference-mark sensor
- 5 = Throttle-valve switch

- 6 = Power-supply relay
- 7 = Trigger boxes
- 8 = High-voltage distributor
- 9 = Ignition coils
- 10 = Ignition/starting switch
- 11 = Battery
- 12 = Map selector

- 13 = Alarm control unit
- A = Control unit ground = at rear on engine block (under fuel-pressure regulator)
- B = Ground of TI trigger boxes Front right on wheel-housing wall (near ignition coil)

- C = LH-Jetronic energization
- D = To LH-Jetronic

### 3. Electrical terminal diagram

**A4**

Electrical terminal diagram  
Porsche



**A5**

Electrical terminal diagram  
Porsche



#### 4. Installation position of components

The electronic ignition control unit is on the right in the front passenger footwell. See picture.

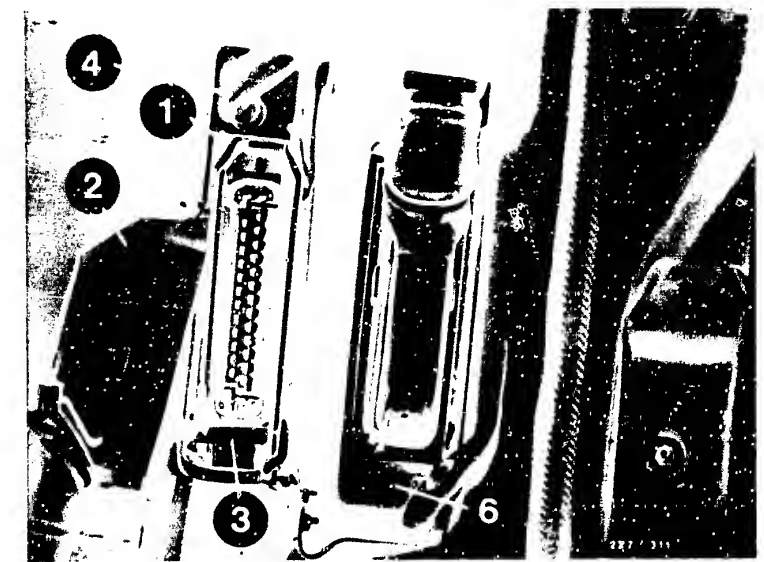
#### How to remove:

Turn back the mat in the front passenger footwell.

Press control-unit plug ratchet spring in direction of arrow and hinge plug upward.

Pull off vacuum hose.

Loosen 4 fastening screws of control unit (to do this, swing floorboard upward)



- 1 = Electronic ignition control unit
- 2 = Control-unit plug
- 3 = Ratchet spring
- 4 = Vacuum hose
- 5 = Floorboard
- 6 = LH-Jetronic control unit

**A6**

Installation position of components

Porsche

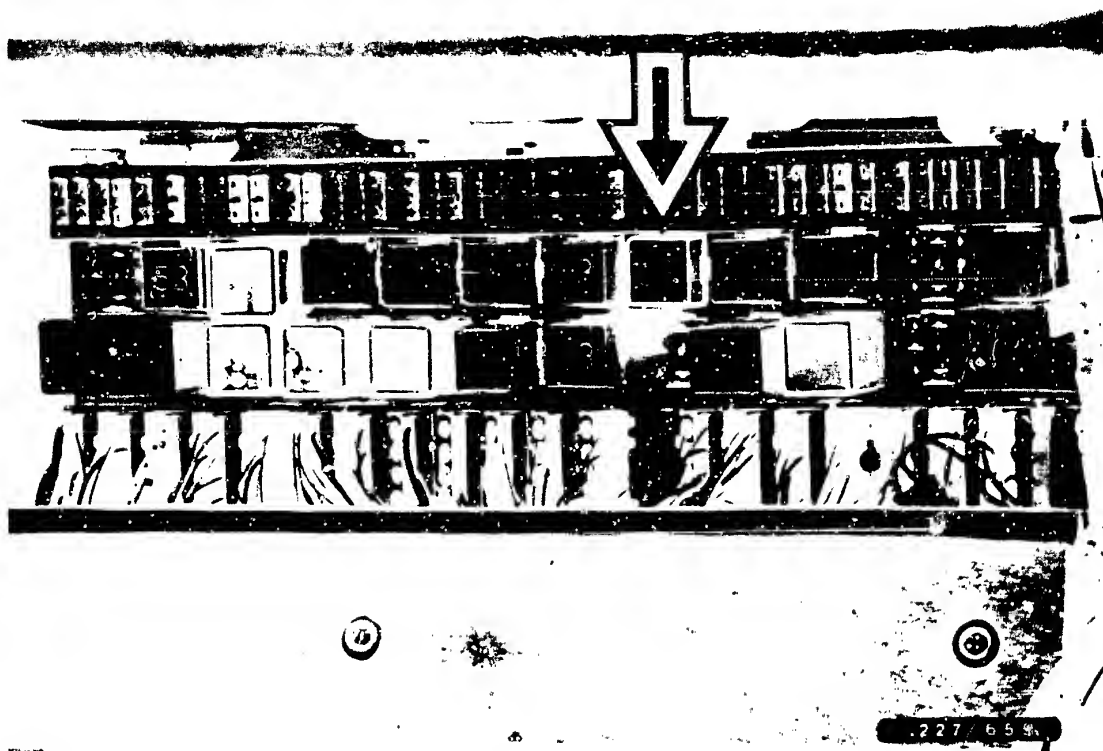


**A7**

Installation position of components

Porsche





Arrow = Ignition power-supply relay

The power-supply relay is in the central-electrics console. (see picture, arrow).

How to remove:

Turn back the mat in the front passenger footwell.

Swing floorboard upward.



The trigger boxes are under a cover (splashguard) in the front of the engine compartment.

The battery is in the luggage compartment at the rear left.

How to remove:

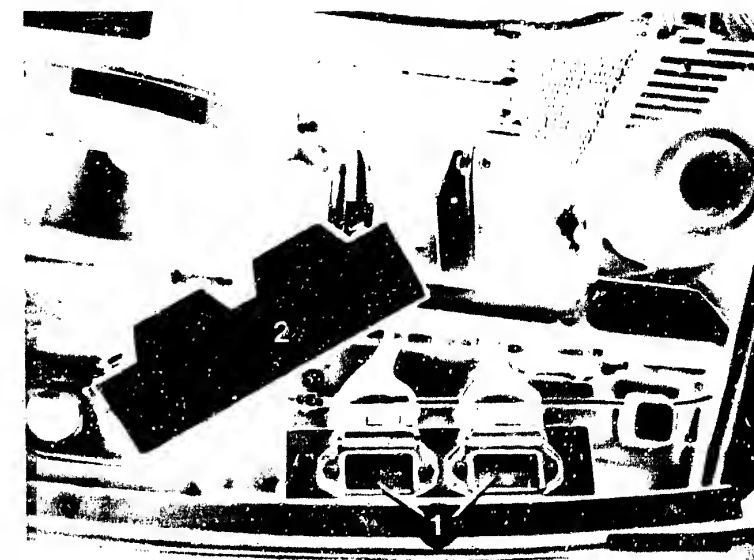
Turn back mat.

Loosen knurled screw (snap-in lock). See arrows, bottom picture.

Remove tool board.

Remove spare wheel.

Remove battery cover.



1 = Trigger boxes  
2 = Cover

1 = Tool board



**A9**

Installation position of components

Porsche



**A10**

Installation position of components

Porsche





Engine temperature sensor, situated behind oil filler cap. See top picture, arrow.

The intake-air temperature sensor is in the bottom part of the air filter. See bottom picture, arrow.

How to remove:

Remove intake-air hoses on left and right.

Remove top part of air filter with air-filter element.

Unscrew 2 M6 screws from bottom part of air filter.

Pull bottom part of air filter vertically upward with attached air-mass sensor (plug-in connection). See bottom picture.



arrow = Engine-temperature sensor

arrow = Intake-air temperature sensor



**A11**

Installation position of components

Porsche



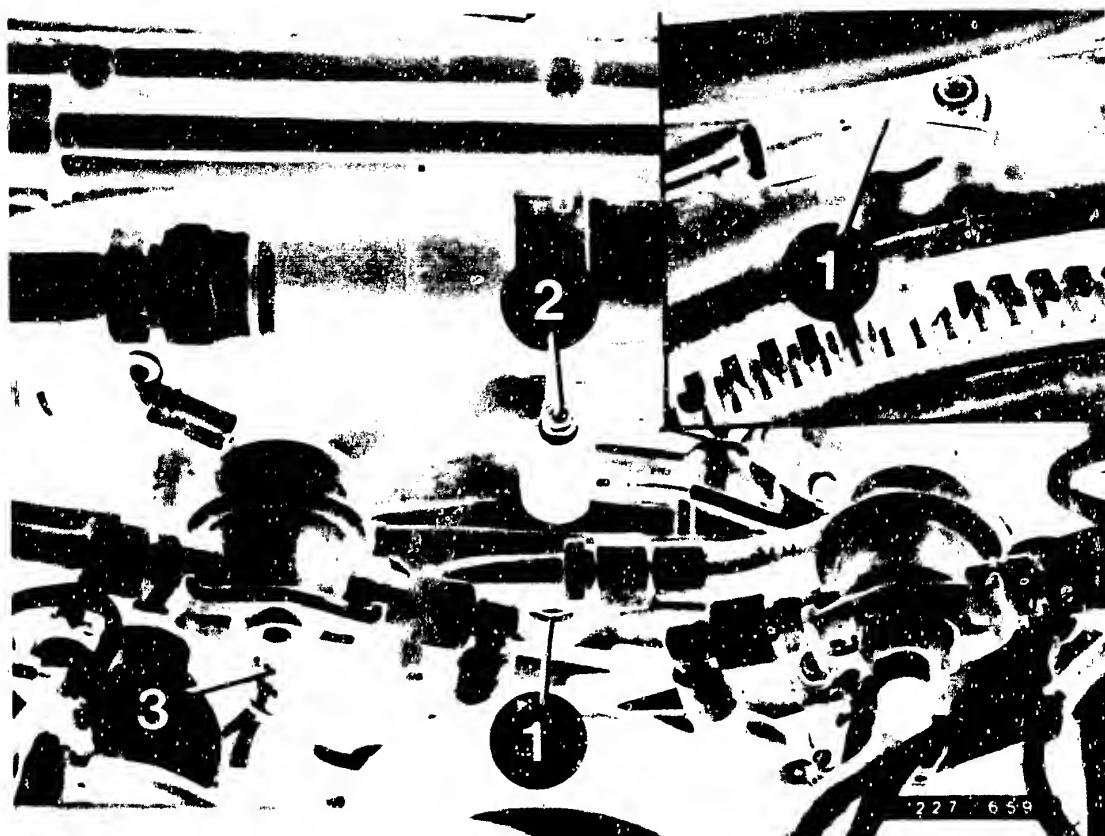
**A12**

Installation position of components

Porsche





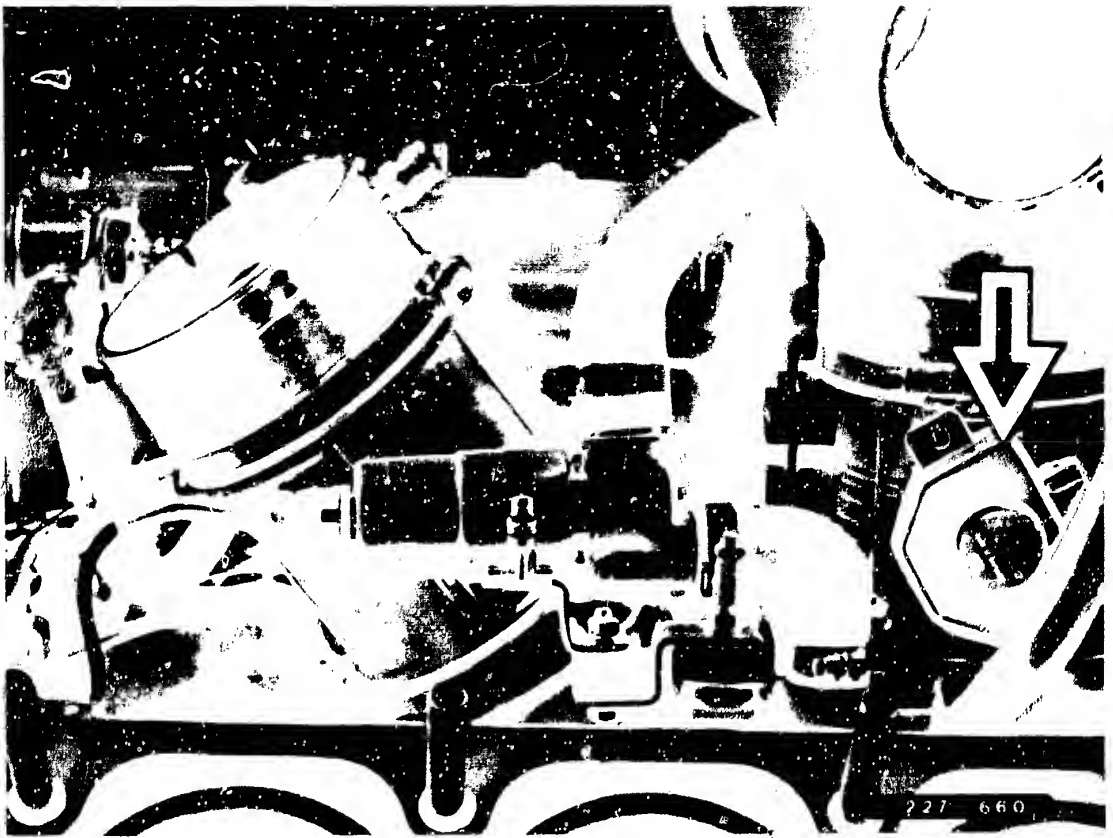


- 1 = Engine-speed and reference-mark sensor
- 2 = Diagnosis sensor (ignition timing, ignition advance)
- 3 = Electronic-ignition control-unit ground

Engine-speed and reference-mark sensor is situated at the rear on the engine block, under the air filter.  
See picture.

Electronic-ignition control-unit ground is situated under the fuel-pressure regulator.





Arrow = Throttle-valve switch

Throttle-valve switch is situated at the front right on the throttle-valve assembly. See picture, arrow:

How to remove:

Remove intake-air distributor and intake manifold.



For fastening of high-voltage distributor rotor and cap,  
see arrow, top and bottom pictures.

Note:

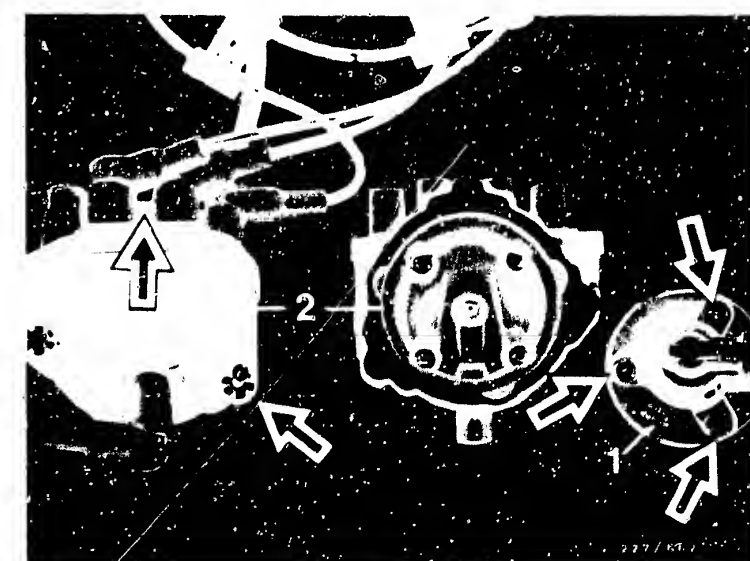
Cyl. 1 - 4 on right-hand side as viewed in forward direction of travel

Cyl. 5 - 8 on left-hand side as viewed in forward direction of travel



1=High-voltage distributor rotor

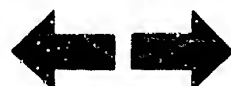
1=Rotor removed  
2=High-voltage distributor cap removed



**A15**

Installation position of components

Porsche



**A16**

Installation position of components

Porsche



## 5. Necessary test equipment and aids

Motortester e.g.	MOT 201	0 684 000 201
Pulse shaper (required for measuring the primary voltage with MOT 200, 201, 202 and 400)		1 684 463 154
Spark gap e.g.		
Ignition-coil and condenser tester or	EFAW 106 A	0 681 100 001
Single spark gap	EF 1177/7	1 684 531 000
Sleeve-type suppressor 5 k $\Omega$		0 356 500 001
Ohmmeter	ETE 014.00	0 684 101 400
or e.g.	Pontavi WH2	Commercially available
Voltmeter e.g.	ETE 014.00	0 684 101 400
Thermal-conduction paste		5 942 860 003
Test prods (for correct connection of testers at plugs)		Commercially available
Test leads (for correct connection of testers at plugs)		KDSZ 0004



Necessary test equipment and aids (continuation)

Vacuum pump e.g.  
from Korinth  
Ludwig-Kloos-Str. 21  
6450 Hanau 7-Steinheim

Mityvac

Commercially  
available

Auxiliary lead for user-fabrication  
(for jumping the ignition power-  
supply relay).

Necessary parts:  
approx. 100 mm of cable 2.5 mm<sup>2</sup>  
2 blade terminals

8 784 480 011



## 6. Danger of accident on electronic ignition systems

Increased demands of modern engines on the ignition system combined with the desire for freedom of maintenance have recently led to electronic ignition systems being fitted as standard. Usually the ignition power of electronic systems (of almost all manufacturers) is higher than that of conventional systems, and there are signs of further increases in power. Electronic ignition systems thus reach a power range which can be highly dangerous if live parts of terminals are touched (both on the primary as well as the secondary sides).

In this connection we should like to point out that the VDE regulations, in particular VDE 0104/7.67 and/or the respective national regulations must be followed when testing or working on the ignition system.

The ignition should always be switched off when working on the ignition system (switch off ignition or voltage source). Such work includes:

- Connecting of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacing parts of the ignition system (spark plug, ignition coil, ignition distributor, ignition cable etc.).

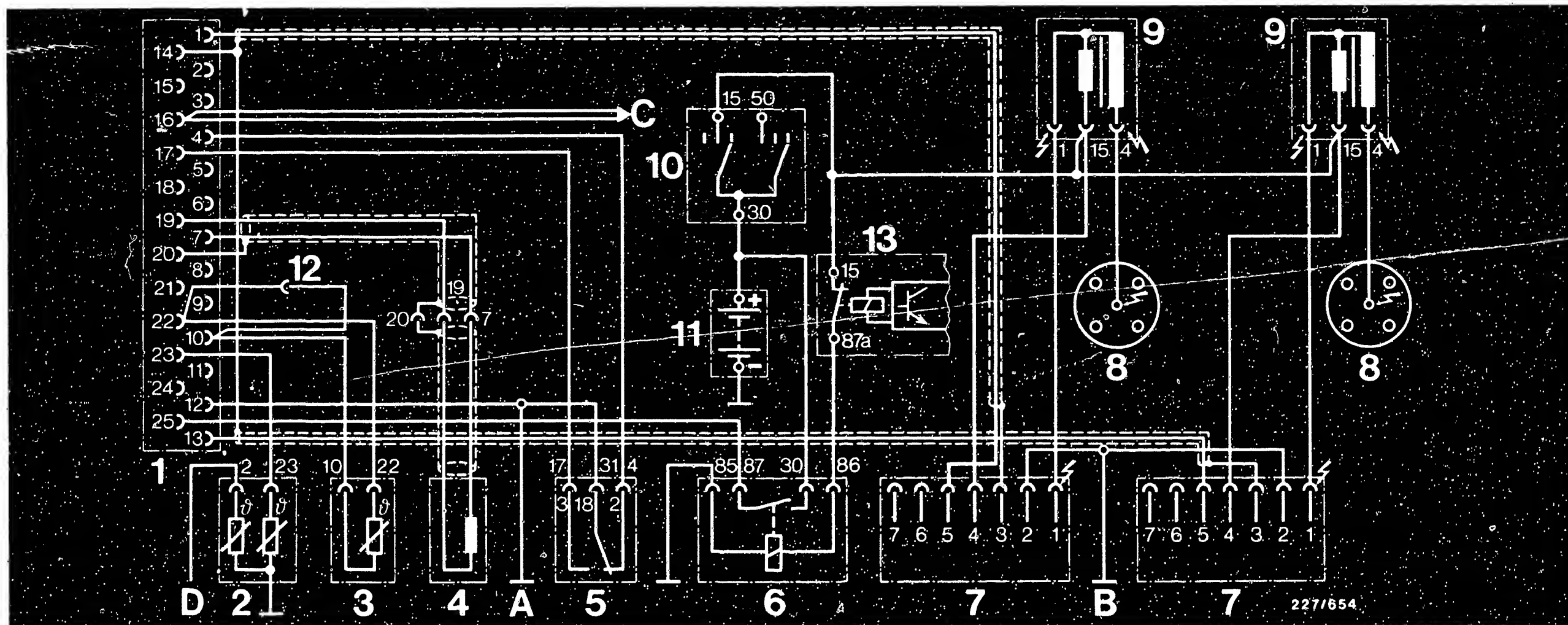


If, while testing the ignition system or during adjustment work on the engine (e.g. mixture preparation), it becomes necessary to switch on the ignition (switch on ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual assemblies of the ignition system (e. g. ignition distributor, ignition coil, trigger box, ignition harness), but also on the wiring harness (e. g. tachometer connection, diagnostic plug), at plug-in connections and test equipment.







Danger arrows: Warning: 400 V ... 25 kV

- 1 = EZ control unit
- 2 = Engine-temperature sensor (double NTC)
- 3 = Intake-air temperature sensor
- 4 = Engine-speed and reference-mark sensor
- 5 = Throttle-valve switch

- 6 = Power-supply relay
- 7 = Trigger boxes
- 8 = High-voltage distributor
- 9 = Ignition coils
- 10 = Ignition/starting switch
- 11 = Battery
- 12 = Map selector

- 13 = Alarm control unit
- A = Control unit ground = at rear on engine block (under fuel-pressure regulator)
- B = Ground of TI trigger boxes Front right on wheel-housing wall (near ignition coil)

- C = LH-Jetronic energization
- D = To LH-Jetronic

The dangerous locations are identified by danger arrows taking the example of the terminal diagram of an electronic ignition system.

**A21**

Danger of accident  
Porsche



**A22**

Danger of accident  
Porsche



7. Incorrect indication of engine speed, dwell angle  
and ignition point

In ignition systems with trigger box 0.227 100 124 (TI-i) with current limitation there may be an incorrect indication of engine speed, dwell angle and ignition point on testers.

For further details see coordinates N 8 - N 12.



## 8. Important vehicle information

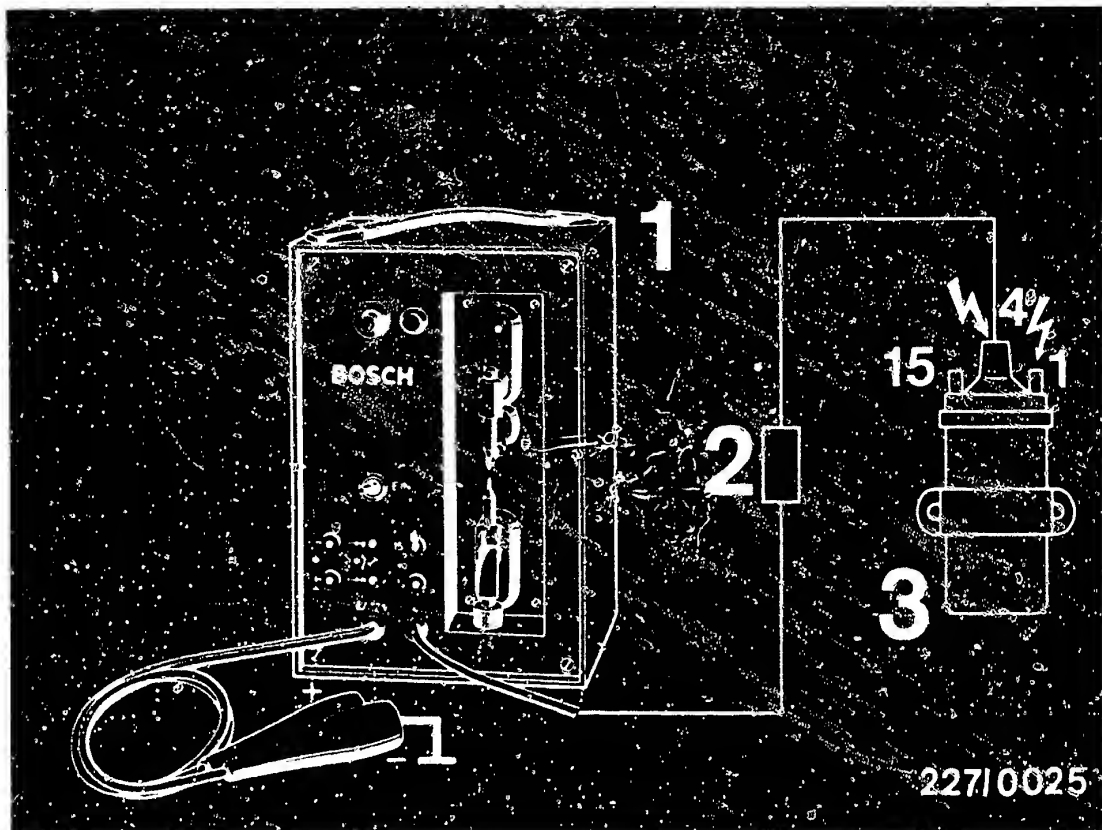
- Resistance measurements must only be performed with the ignition switched off or with the battery disconnected (measuring instrument defective).
- When performing the compression test; remove both trigger-box plugs or firmly ground ignition coils term. 4 using auxiliary cable (dangerous high voltage, insulation damage to ignition coil, high-voltage distributor, ignition harness).

### Note:

The extra cable must be suppressed with at least 2 k  $\Omega$  , e. g. with sleeve-type suppressor (5 k  $\Omega$  ) 0 356 500 001.

- The specified ignition coil (see Part No.) must not be replaced with a different ignition coil.
- No suppression capacitor must be connected to ignition coil terminal 1.
- Ignition coil terminal 1 must not be brought into contact with ground as a theft-proofing measure (ignition coil will be destroyed when ignition is switched on).
- No battery + or test lamp must be connected to ignition coil terminal 1 (trigger box will be destroyed).
- H.T. ignition cable from ignition coil term. 4 to high-voltage distributor term. 4 must not be removed during operation.
- There must be no arcing from ignition coil term. 4 to ignition coil term. 1 and term. 15. Trigger box may be destroyed.





- 1 = Spark gap
- 2 = 5 k $\Omega$  sleeve-type suppressor
- 3 = Ignition coil

Danger arrows:

Warning: 400 V ... 25 kV

- In order to prevent the trigger box from being irreparably damaged, when using a spark gap, an interference-suppression resistor of at least 2 k $\Omega$  must be connected between the spark gap and ignition coil terminal 4, e. g. sleeve-type suppressor (5 k $\Omega$  ) 0 356 500 001.

**B1**

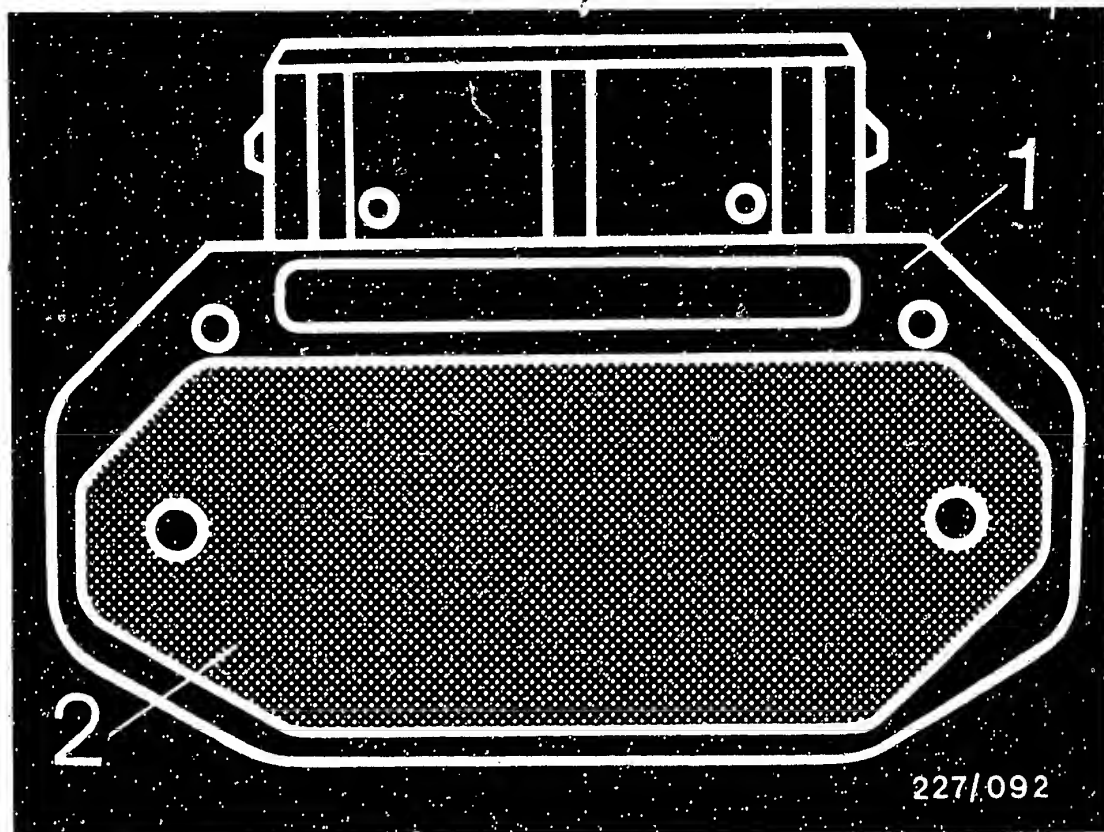
Important vehicle information

Porsche



- To prevent the trigger box from being irreparably damaged, the secondary side of the ignition system must have at least 4 k $\Omega$  interference suppression whereby the original distributor rotor with 1 k $\Omega$  interference-suppression resistor must be fitted (even in the case of radio and spark interference suppression do not use a 5 k $\Omega$  distributor rotor).
- Disconnect the electronic ignition control unit plug and trigger box plugs only with the ignition switched off.
- Do not disconnect battery with engine running.
- Incorrect battery polarity may lead to the destruction of trigger boxes, ignition coil as well as electronic ignition control unit.
- Do not use a starting aid with more than 16 V or a fast charger for starting.





1 = Trigger box

2 = Base plate

- Before mounting the trigger box, the base plate must be coated with thermal conduction paste. Apply thermal conduction paste only with a suitable object (screwdriver, matchstick etc.)

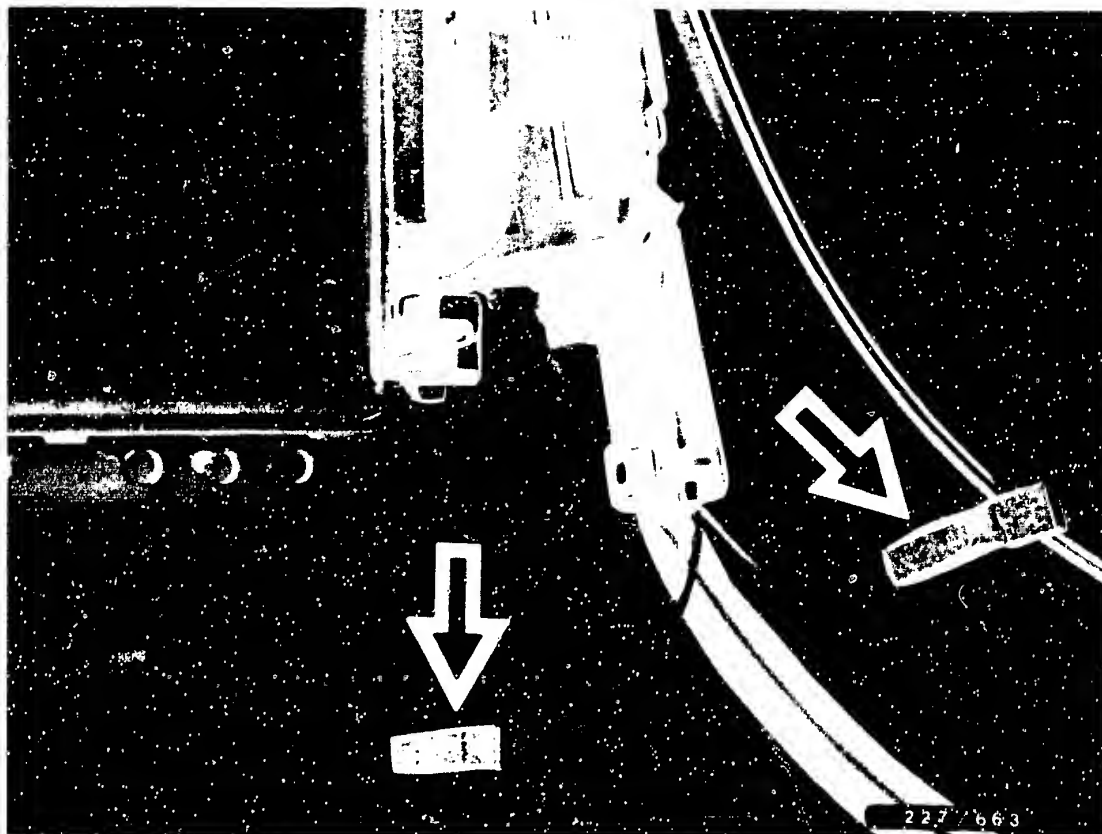
Do not apply thermal conduction paste to painted parts.

**B3**

Important vehicle information

Porsche





Arrow = Plug connector

#### Map selector

In case of poor fuel quality, the map (full load/high part load) can be RETARDED by approx. 3° crankshaft by means of a plug connector on the electronic-ignition control-unit plug (see picture, arrows).  
For this, the plugs are connected together.

When fuel of the prescribed octane number is again available, take the plugs apart.





## 9. Trouble-shooting program

### 9.1 Procedure - trouble-shooting chart

The trouble-shooting chart beginning on Coordinate C3 contains customer complaint (fault symptoms), cause of trouble, test instructions and coordinate references.

The possible cause of the fault should be selected from the trouble-shooting chart in accordance with the customer complaint (fault symptom).

If the cause of the fault is not clear, start testing with the detailed, self-contained trouble-shooting program beginning on Coordinate C9.

If the cause of the fault is clear from the trouble-shooting chart, direct trouble-shooting is possible by going to the stated coordinate without having to perform the entire trouble-shooting program for each fault.

If there is no coordinate reference, trouble-shooting must be performed in accordance with the "Test instructions" column.

### 9.2 Procedure - trouble-shooting program

The trouble-shooting program starting on Coordinate C9 is divided into 3 rows of boxes.

The left-hand row contains test instructions and test specifications.

The center row contains repair instructions.

The right-hand row contains the illustrations/terminal diagrams belonging to the text and the explanations of the items in the picture.

If the questions asked in the left-hand row can be answered conclusively with "yes", then proceed to the next test down.

If the answer to the question is "no", branch to the center row and carry out the tests given there.

### 9.3 Before testing, make sure of the following:

Battery fully charged, fuel system O.K., engine mechanically O.K. (e. g. compression, valve clearance etc.). Ambient temperature/ignition system temperature 0° to 100° C (temperature has a considerable effect on measured values).

**C1**

Trouble-shooting  
Porsche



**C2**

Trouble-shooting  
Porsche



# 9.4 Trouble-shooting chart Customer complaint (fault symptom)

1. Starting motor operates, but engine fails to start

2. Rough idling

3. Poor throttle response

4. Engine lacks power

5. Misfiring

6. Fuel consumption too high

7. Engine pings when accelerating

8. Backfiring

9. Engine becomes too hot

									Cause of fault	Test instructions	Coordinate
•	•	•	•	•	•	•	•	•	Not clear	Perform detailed trouble-shooting	C 9
•	•	•	•	•	•		•		Spark plugs defective	Assess using ignition oscillogram or remove spark plug and make visual examination.	-----
•	•	•	•	•					Shunt on secondary side	Assessment of ignition coil, high-voltage distributor, ignition harness and spark plug by means of ignition oscillogram or visual examination.	-----
•	•	•	•	•					Open circuit on secondary side	Assessment of ignition coil, high-voltage distributor, ignition harness and spark plug by means of ignition oscillogram or continuity test with ohmmeter.	-----
•	•	•	•	•					Ignition coil defective	-	C11

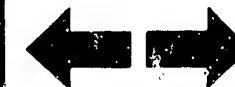
C3

Trouble-shooting program  
Porsche



C4

Trouble-shooting program  
Porsche



# Trouble-shooting chart (continued)

## Customer complaint (fault symptom)

1. Starting motor operates, engine fails to start
2. Rough idling
3. Poor throttle take-up (flat spot during acceleration)
4. Engine lacks power
5. Misfiring
6. Fuel consumption too high
7. Engine pings during acceleration
8. Backfiring
9. Engine overheats

5. Engine over-rev									<u>Cause of trouble</u>	<u>Test instructions</u>	<u>Coordinates</u>
	●	●	●	●	●				Interference-suppression resistors defective	Assess using ignition oscillogram or perform resistance measurement.	-
		●							Thermo-switch defective		C 15
						●			Intake-air temperature sensor defective		C 17
		●	●						Throttle-valve switch defective		C 19...D 1
●									Control-unit control signal for LH-Jetronic incorrect		D 7
●	●	●	●	●	●	●	●	●	Ignition timing incorrect	To prevent incorrect measurements, test must be performed as described on Coordinates on right	C 15...D 9
		●	●			●		●	Vacuum sensor defective		D 11

**C5**

Trouble-shooting chart  
Porsche



**C6**

Trouble-shooting chart  
Porsche



# Trouble-shooting chart (continued)

## Customer complaint (fault symptom)

1. Starting motor operates, engine fails to start
2. Rough idling
3. Poor throttle take-up (flat spot during acceleration)
4. Engine lacks power
5. Misfiring
6. Fuel consumption too high
7. Engine pings during acceleration
8. Backfiring
9. Engine overheats

									<u>Cause of trouble</u>	<u>Test instructions</u>	<u>Coordinates</u>
•									Open circuit on primary side		E 1
•									Control unit power supply defective	---	E 3
•			•						Engine-speed and reference-mark sensor defective	---	E 9...E15
•									Control unit control signal for output stages incorrect	---	E 17
•	•		•				•		Firing sequence incorrect	1-3-7-2-6-5-4-8	---

**C7**

Trouble-shooting program

Porsche



**C8**

Trouble-shooting program

Porsche



### 9.5 Trouble-shooting programm

Test primary signal. If no oscilloscope or tachometer available, check whether ignition spark across spark gap.

The following tests must be performed on both ignition coils.

Primary signal testing with oscilloscope

Connect oscilloscope to ignition coil as per operating instructions.

Start engine.

Oscilloscope must indicate a primary voltage (of any value).

Primary signal testing with tachometer

Connect tachometer to ignition coil as per operating instructions.

Start engine.

Tachometer must indicate a reading (of any value).

Ignition spark testing with spark gap

Remove H.T. ignition cable terminal 4 from ignition coil.

Connect spark gap including sleeve-type suppressor

(5 k $\Omega$ ) to ignition coil.

Adjust spark gap to 5 mm.

Start engine.

There must be sparks across the spark gap.

Primary signal present or ignition sparks across spark gap?

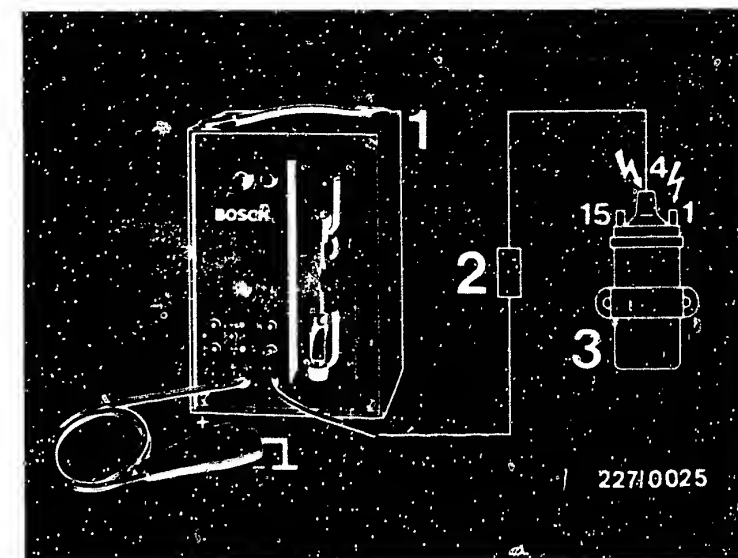
↓ yes

Continued on C11/C12

no →

If no primary signal or no ignition spark,  
continue testing at E 1

Tests from C11 onwards not necessary.



Danger arrows:

Warning: 400 V ... 25 kV

1 = Spark gap

2 = 5 k $\Omega$  sleeve-type suppressor

3 = ignition coil

C9

Trouble-shooting program

Porsche

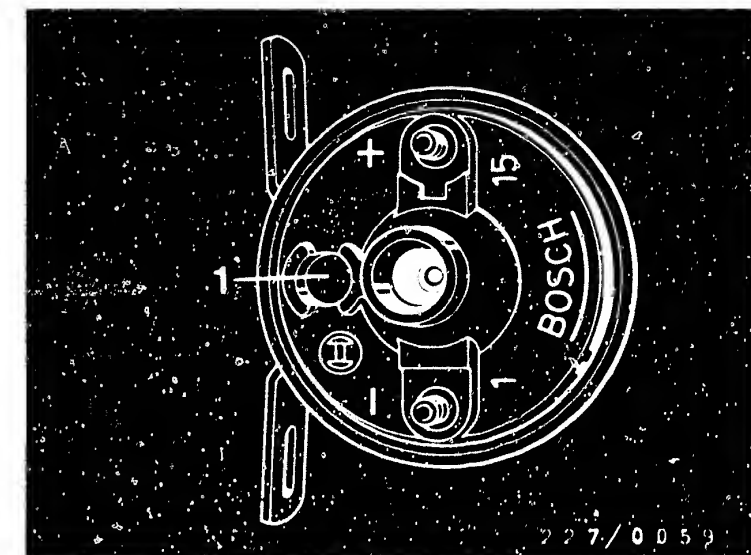
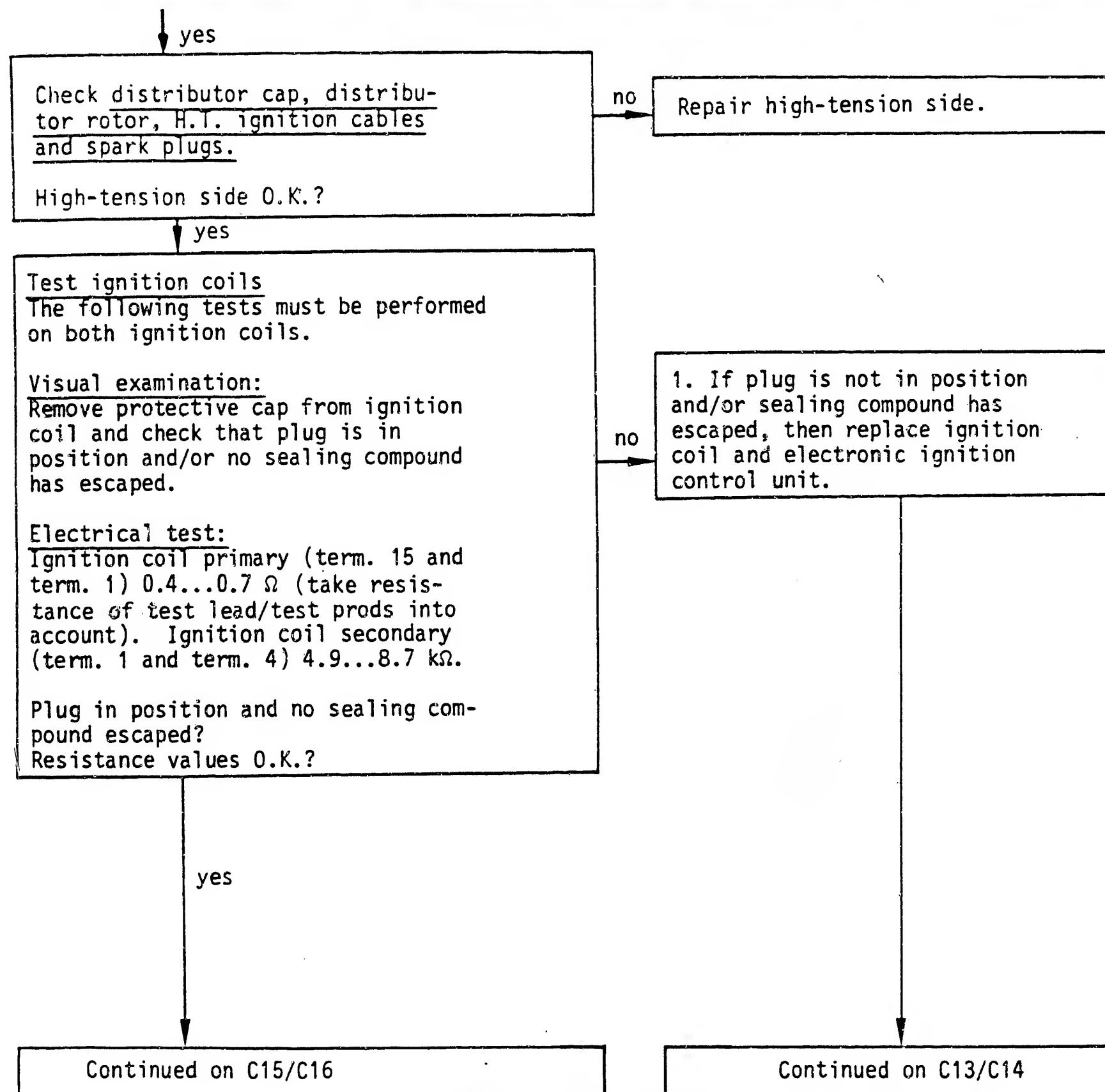


C10

Trouble-shooting program

Porsche

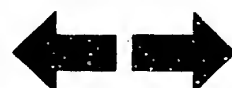




1 = Plug

**C11**

Trouble-shooting program  
Porsche



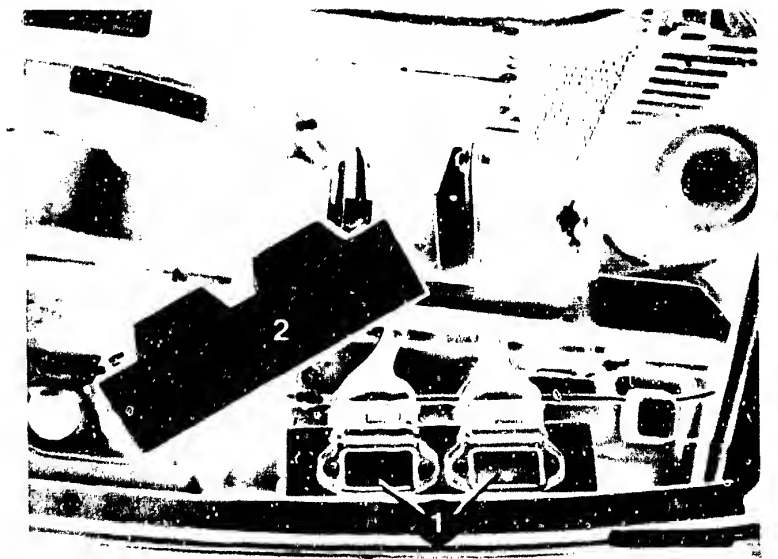
**C12**

Trouble-shooting program  
Porsche



continued

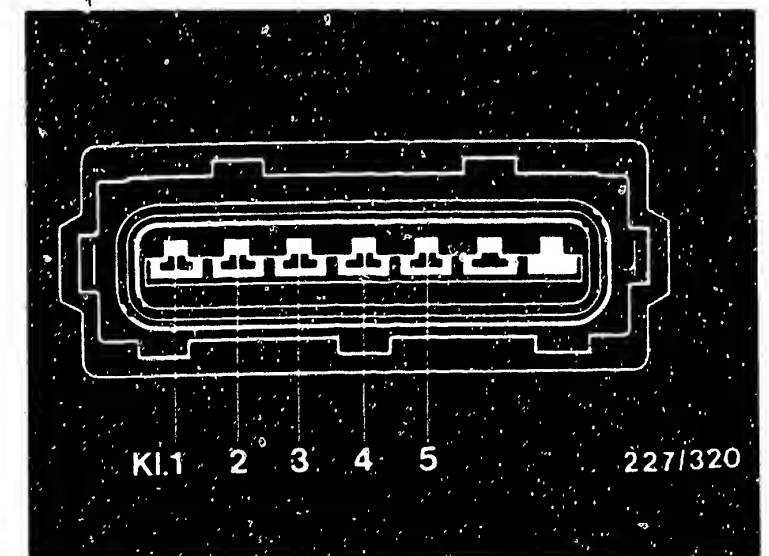
2. Disconnect lead term. 1 of defective ignition coil (plug not in position, sealing compound escaped). Remove both trigger-box plugs. Connect ohmmeter to disconnected lead of ignition coil term. 1 and, one after the other, to both trigger-box plugs term. 1. The trigger box must be replaced whose trigger-box plug has indicated approx. 0  $\Omega$  (continuity) on the ohmmeter.
3. If resistance values are not O.K., replace ignition coil.



1 = Trigger boxes  
2 = Cover

yes

Trigger-box plug



Continued on C15/C16

**C13**

Trouble-shooting program  
Porsche



**C14**

Trouble-shooting program  
Porsche





yes

Test engine-temperature sensor.  
Turn back mat in front passenger footwell.  
Remove electronic ignition control unit plug. Connect ohmmeter to disconnected electronic-ignition control-unit plug term. 23 and term. 12.  
See table for resistance values.

Coolant temperature	Resistance
0°C	4.4...6.8 kΩ
+ 15...30°C	1.4...3.6 kΩ
+ 40°C	0.9...1.3 kΩ
+ 60°C	480...720 Ω
+ 80°C	250...390 Ω

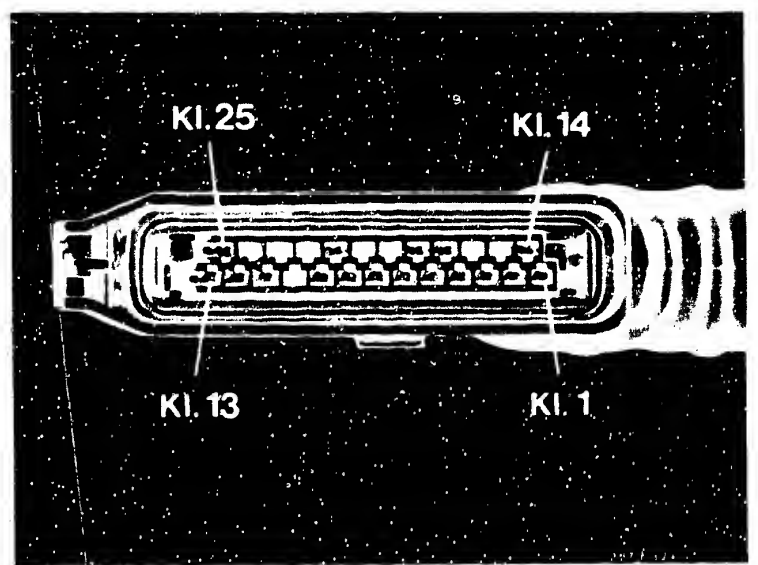
Resistance O.K. at given coolant temperature?

no

1. If ohmmeter indicates infinity ( $\infty$ ), disconnect engine-temperature sensor connector.

Connect ohmmeter to engine-temperature sensor connector term. 23 and control-unit plug term. 23.  
Ohmmeter must indicate approx. 0 Ω (continuity)  
Eliminate open circuit.

2. If resistance value is different, replace engine-temperature sensor.

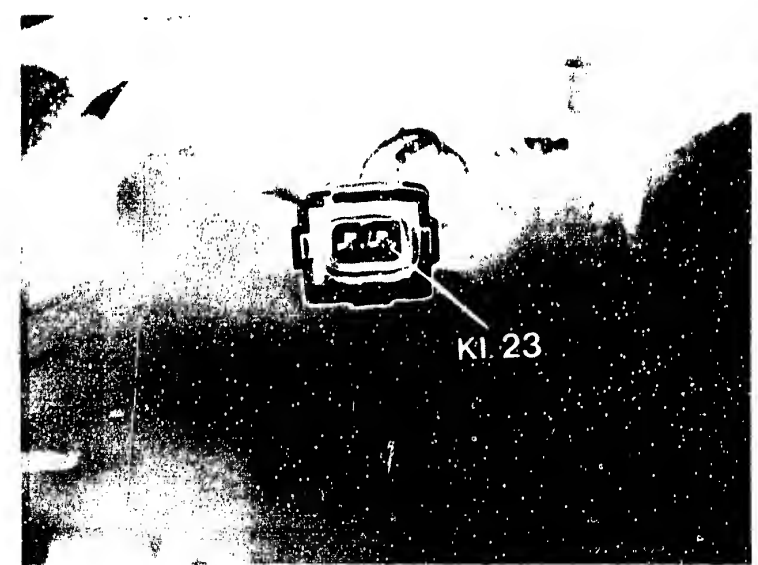


Electronic ignition control-unit plug

yes

Continued on C17/C18

Engine-temperature sensor connector



yes

Test intake-air temperature sensor.

Connect ohmmeter to disconnected electronic-ignition control-unit plug term. 10 and term. 22.

See table for resistance values.

Ambient temperature	Resistance
0°C	4.4...6.8 kΩ
+ 15...30°C	1.4...3.6 kΩ
+ 40°C	0.9...1.3 kΩ
+ 60°C	480...720 Ω
+ 80°C	250...390 Ω

Resistance O.K. at given ambient temperature?

no

1. If ohmmeter indicates  $\infty \Omega$ , disconnect intake-air temperature sensor plug. See bottom picture. Connect ohmmeter consecutively to:

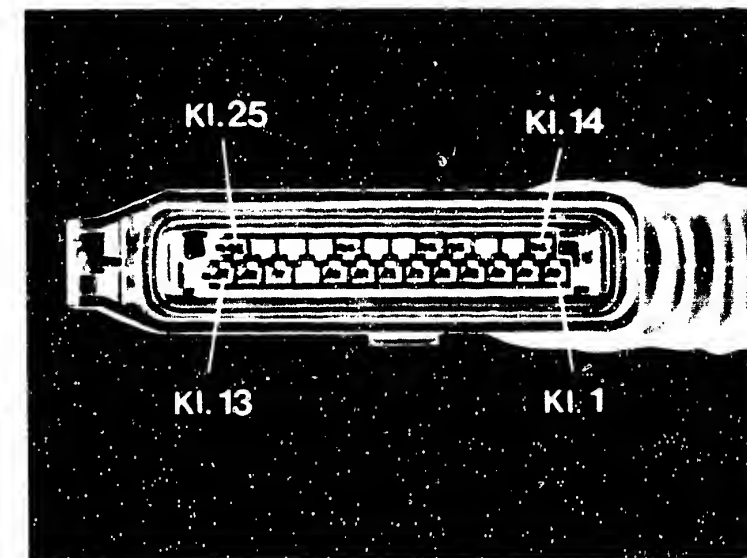
Intake-air temperature sensor connector

Control-unit plug

Term. 22 and Term. 22  
Term. 10 and Term. 10

In each case, ohmmeter must indicate approx. 0  $\Omega$  (continuity). Eliminate open circuit.

2. If resistance is different, replace intake-air temperature sensor.



Electronic ignition control-unit plug

yes

Continued on C19/C20

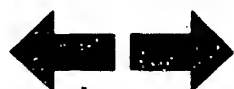


Intake-air temperature sensor connector

C17

Trouble-shooting program

Porsche



C18

Trouble-shooting program

Porsche



yes

Test idle contact of throttle-valve switch.  
Disconnect LH-Jetronic control-unit plug.  
Connect ohmmeter to disconnected electronic-ignition control unit plug term. 4 and term. 12. See top picture.  
Throttle valve is in idle position.  
Ohmmeter must indicate approx. 0  $\Omega$  continuity.  
Open throttle valve by approx. 1° Ohmmeter must indicate infinity ( $\infty$ ).  
Resistance values O.K.?

no

1. Disconnect plug from throttle-valve switch plug connector. See center picture. Connect ohmmeter one after the other to:

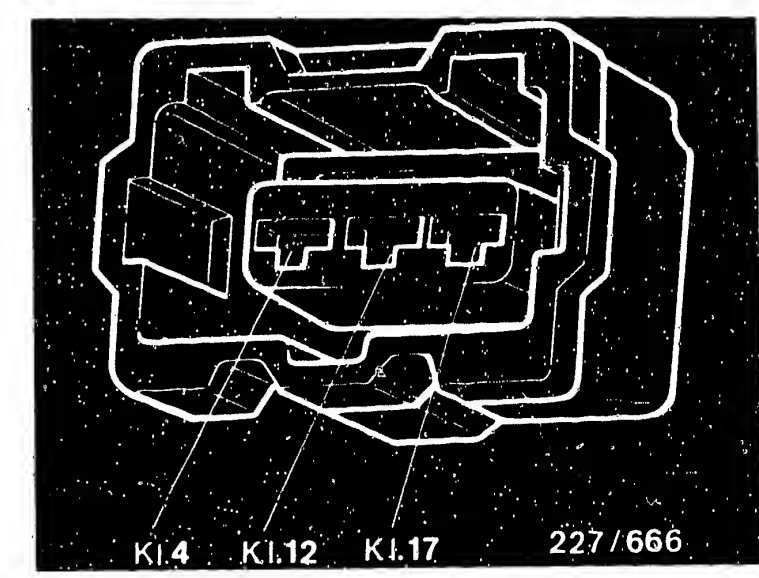
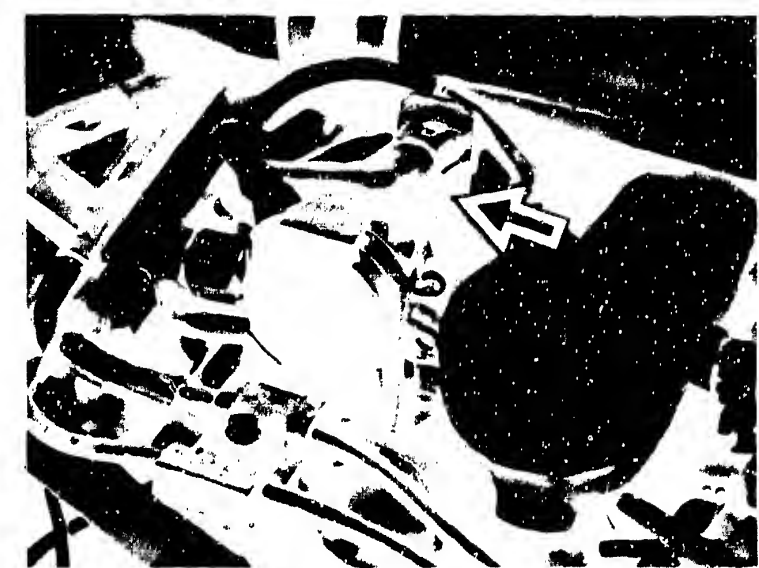
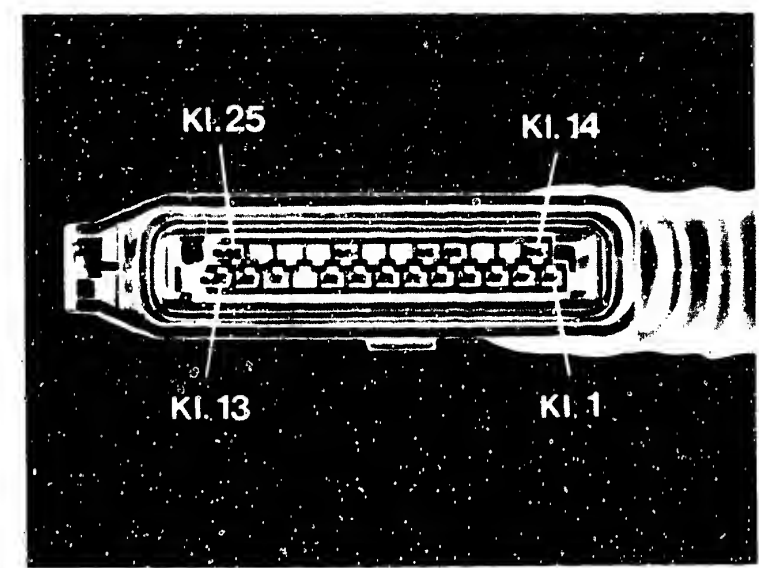
Plug of throttle-valve switch plug connector (bottom picture)	Electronic-ignition-control-unit plug
Term. 4	and Term. 4
Term. 12	and Term. 12

In each case, ohmmeter must indicate approx. 0  $\Omega$  (continuity).  
Eliminate open circuit.

yes

Continued on C23/C24

Continued on C21/C22



Continued

2. Connect ohmmeter to throttle-valve switch plug connector term. 4 and term. 12. See top picture.

Throttle valve is closed.

Resistance approx.  $0\ \Omega$ .

Open throttle valve by approx.  $1^\circ$ .

If resistance not O.K., check for open circuit in lead between plug connector and throttle-valve switch plug. Eliminate open circuit. If there was no open circuit, adjust throttle-valve switch.

Procedure:

Remove intake-air distributor and intake manifold.

Slightly loosen fastening screws of throttle-valve switch. See bottom picture, arrows. Turn throttle-valve switch in a counterclockwise direction until stop can be felt (idle contact now closed). Ohmmeter must indicate approx.  $0\ \Omega$ .

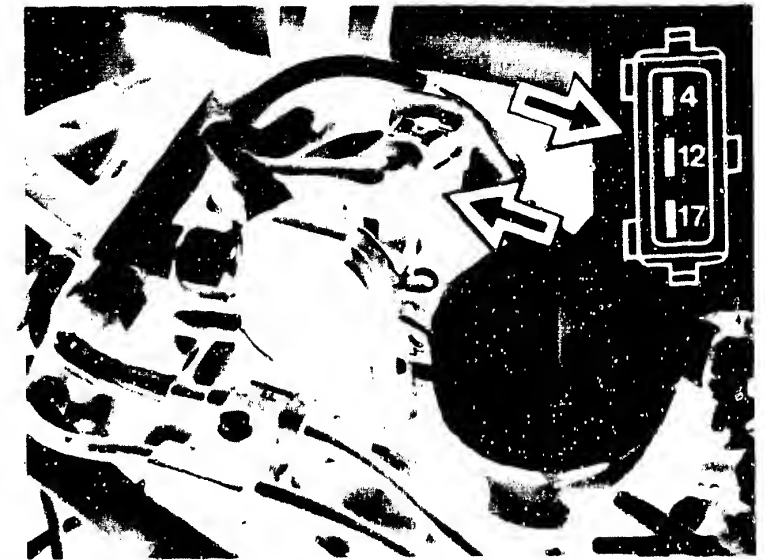
If approx.  $0\ \Omega$  not reached, then replace throttle-valve switch. Tighten fastening screws of throttle-valve switch.

Check:

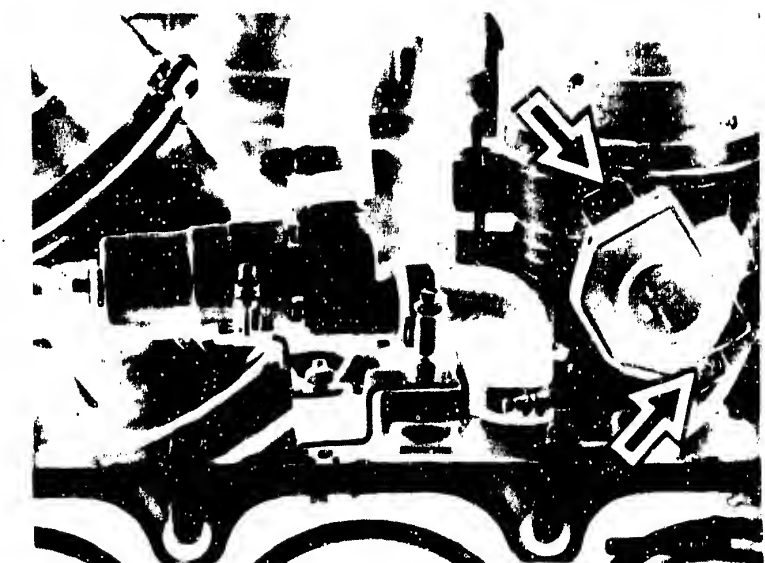
Open throttle valve by approx.  $1^\circ$ .  
Ohmmeter must indicate infinity ( $\infty$ ).

yes

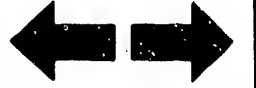
Continued on C23/C24

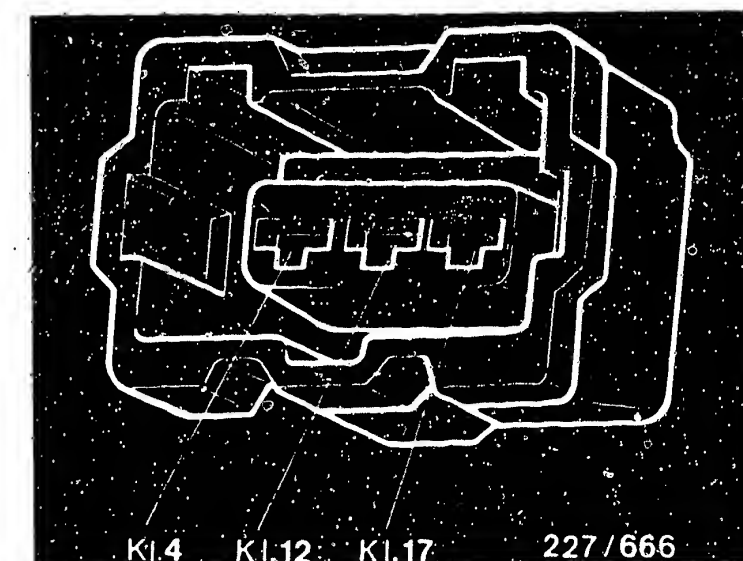
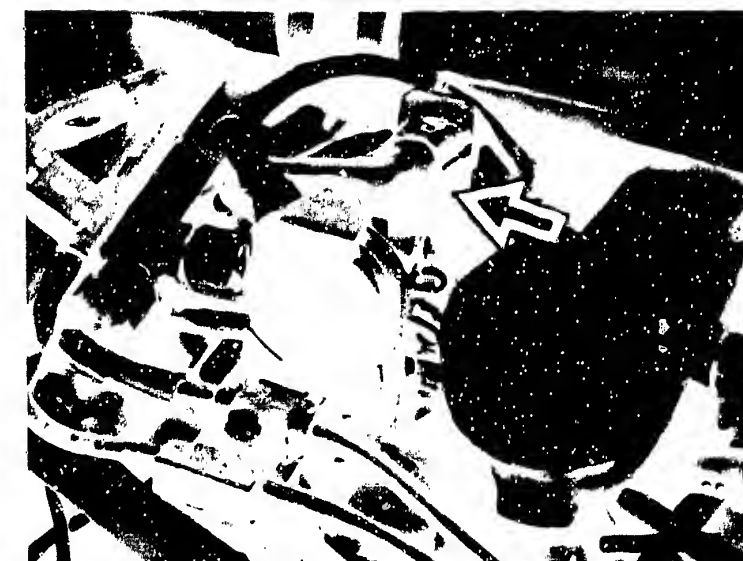
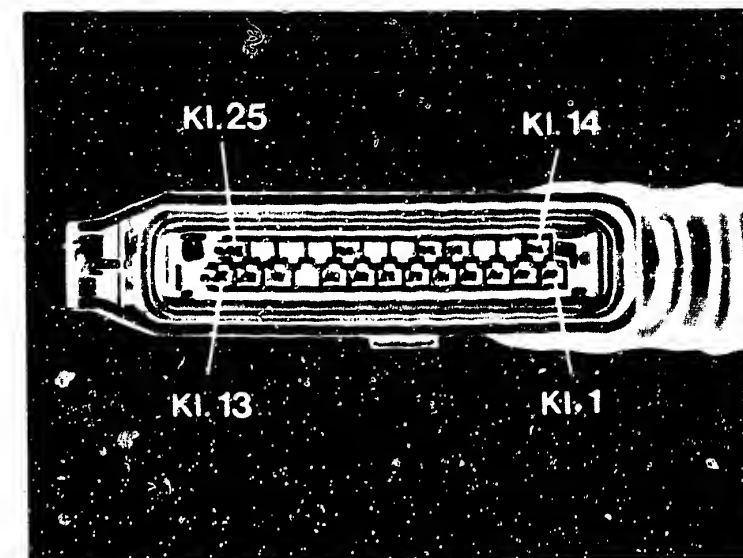
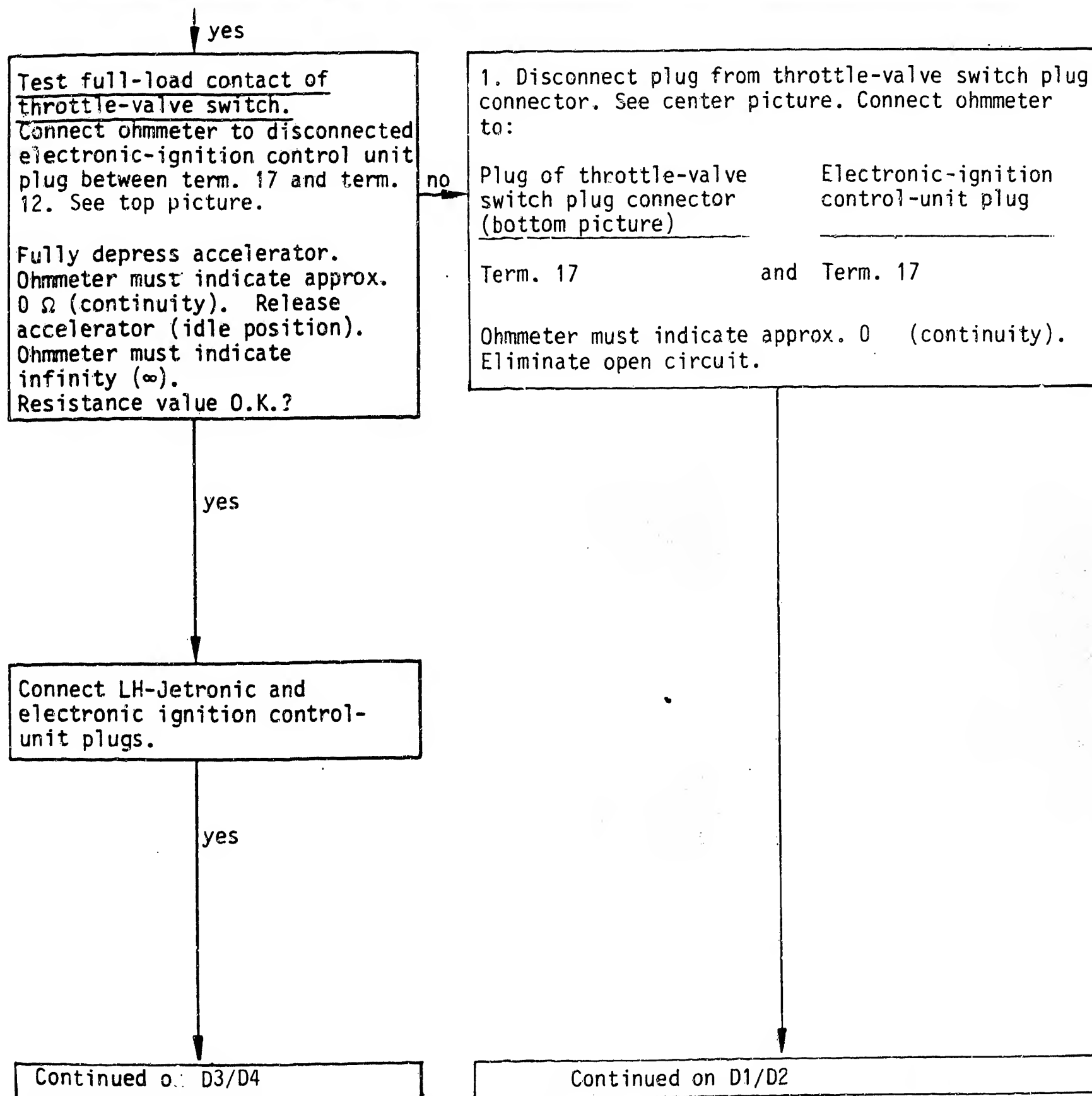


Throttle-valve switch plug connector



Throttle-valve switch







Continued

2. Connect ohmmeter to throttle-valve switch plug connector term. 12 and term. 17. See top picture. Fully depress accelerator. Ohmmeter must indicate approx.  $0\ \Omega$  (continuity). Release accelerator (idle position) Ohmmeter must indicate  $\infty\Omega$ . If resistance readings not O.K., check for open circuit in lead between plug connector and throttle-valve switch. Eliminate open circuit. If there was no open circuit, replace throttle-valve switch.

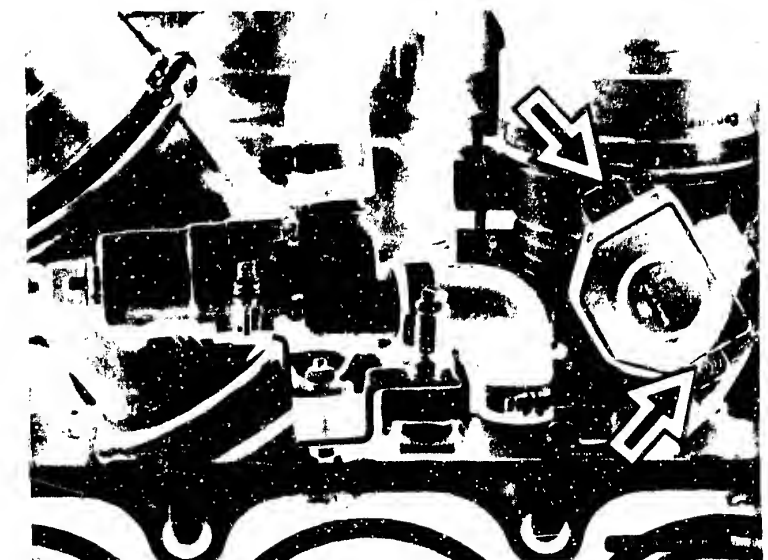


Throttle-valve switch plug connector

yes

Continued on D3/D4

Throttle-valve switch



D1

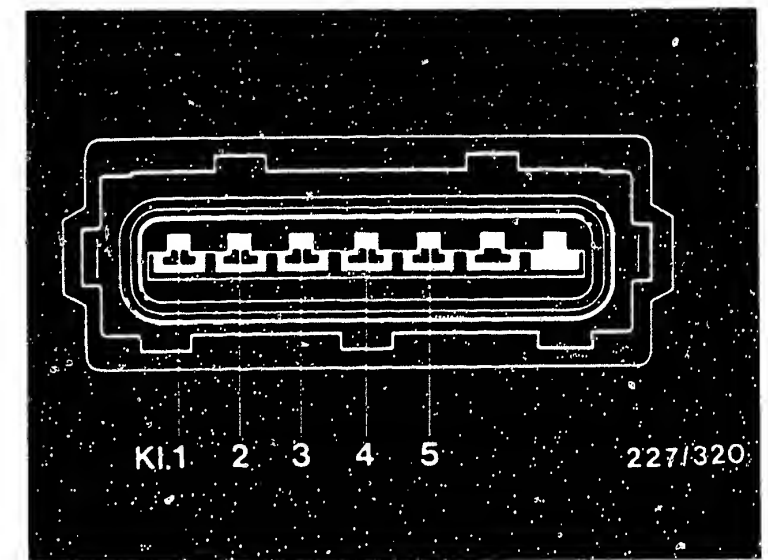
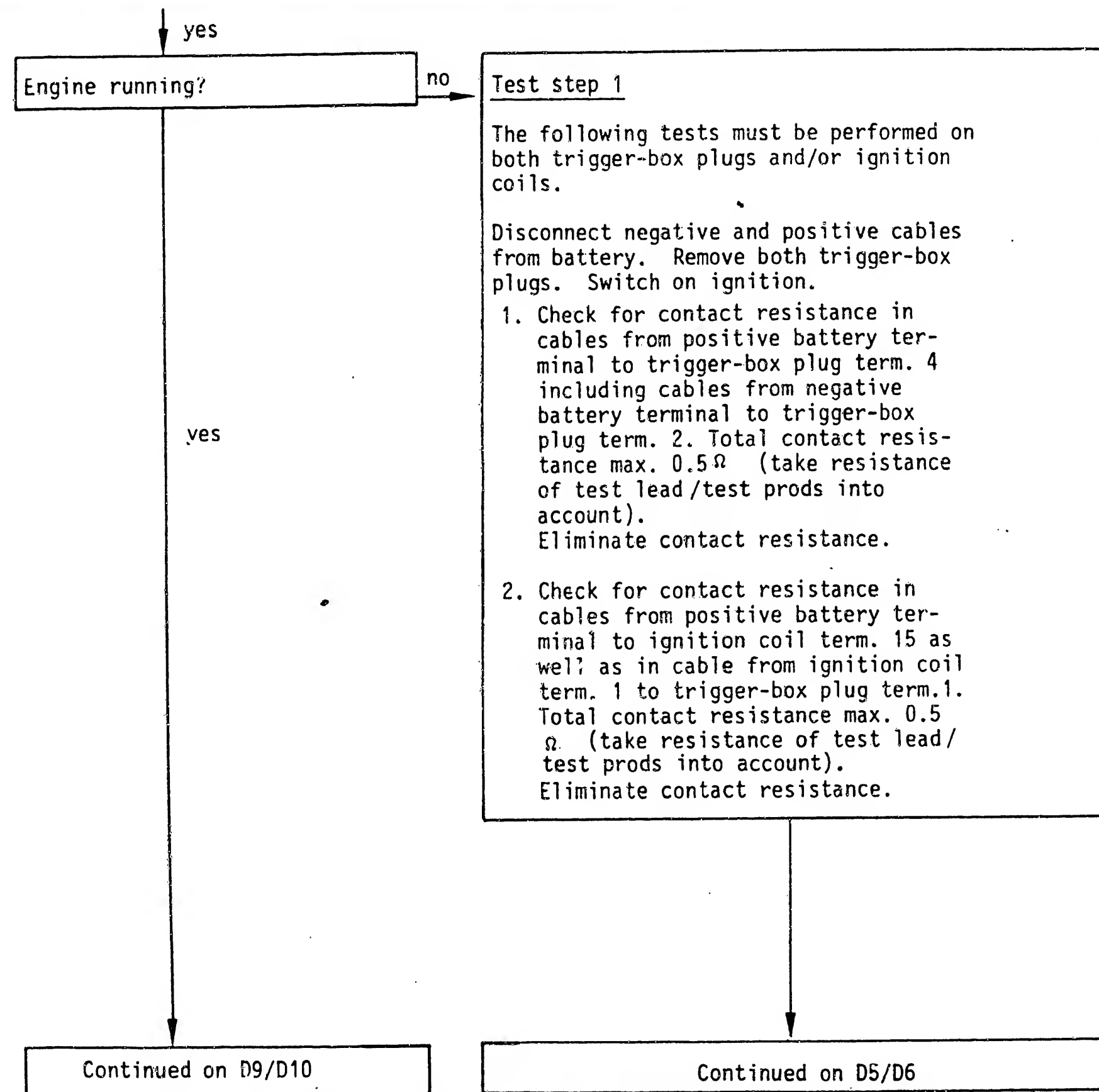
Trouble-shooting program  
Porsche



D2

Trouble-shooting program  
Porsche





Trigger-box plug



Continued

### Test step 2

Electronic ignition control-unit plug is connected.

Remove LH-Jetronic control-unit plug.

Connect oscilloscope according to operating instructions with program switch in "special" position.

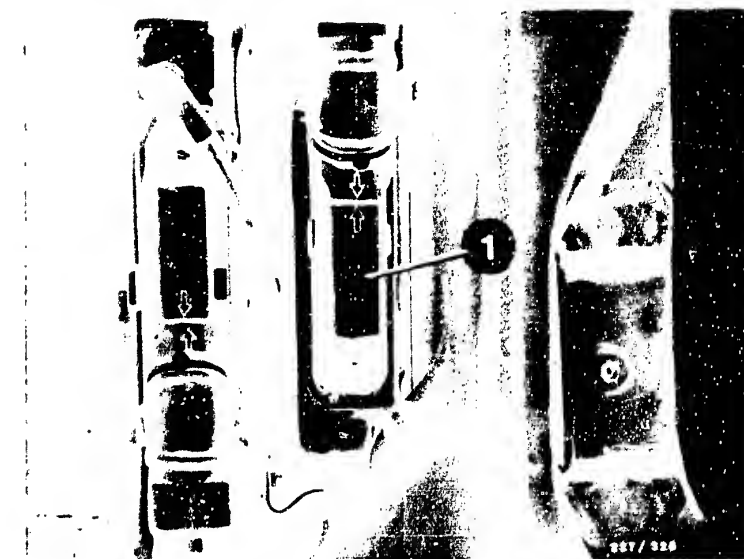
For example, MOT 201:

Connect red and black clamps to disconnected LH-Jetronic control-unit plug term. 1 (+) and ground (-).

yes

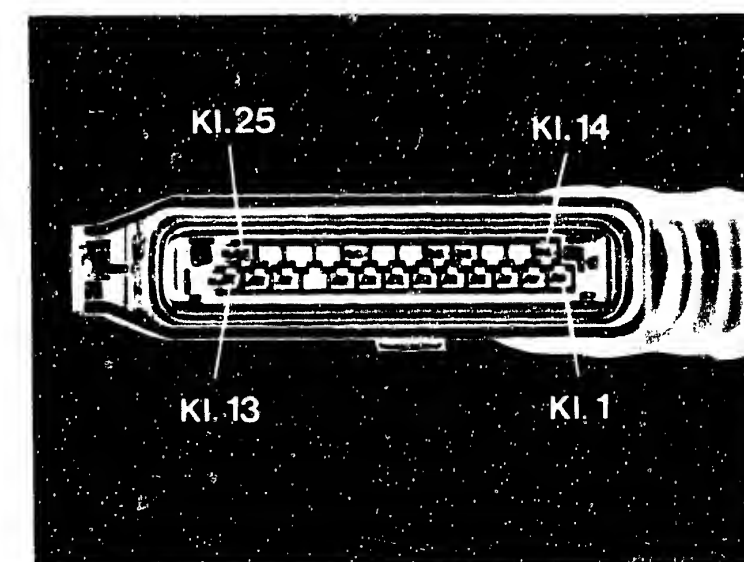
Continued on D9/D10

Continued on D7/D8



1 = LH-Jetronic control-unit plug

LH-Jetronic control-unit plug



D5

Trouble-shooting program  
Porsche



D6

Trouble-shooting program  
Porsche



Continued

Start engine.  
Oscilloscope must show a control signal.  
See top diagram.  
If no control signal is shown, check for  
open circuit in lead from LH-Jetronic  
control-unit plug term. 1 (see center  
picture) to electronic ignition control-  
unit plug term. 16 (see bottom picture).  
Eliminate open circuit.  
If there was no open circuit, replace  
electronic ignition control unit. If test  
steps 1 and 2 O.K., replace trigger box(es).

yes

Continued on D9/D10

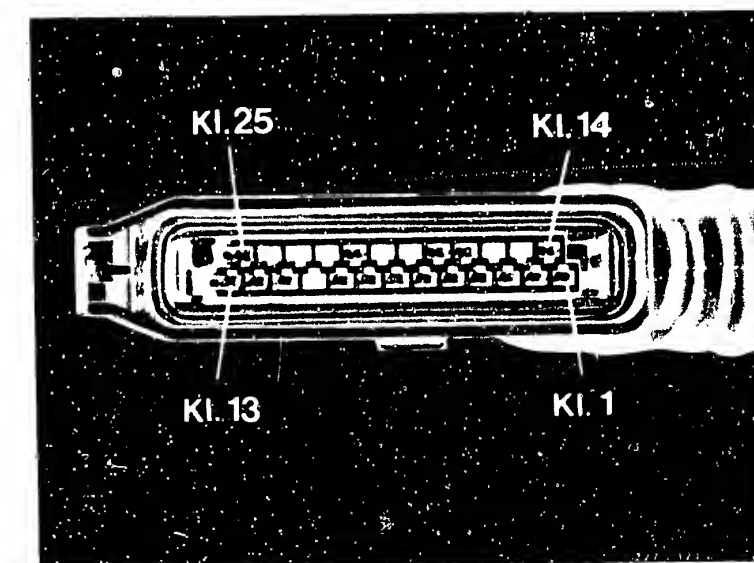
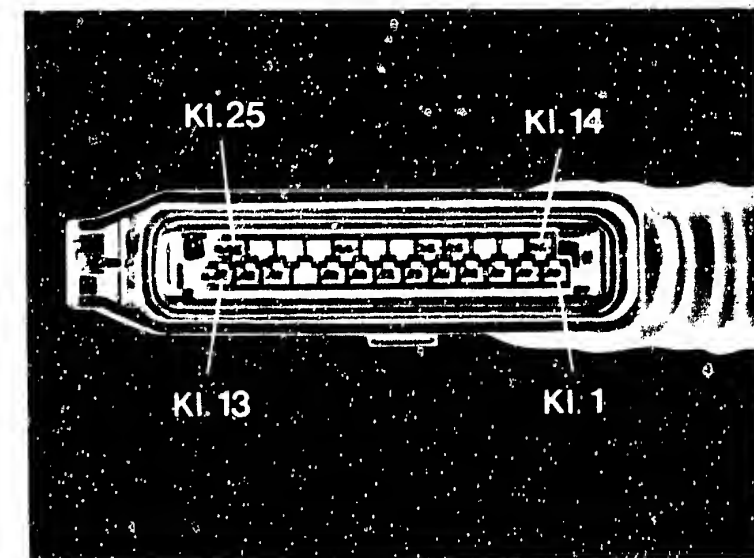
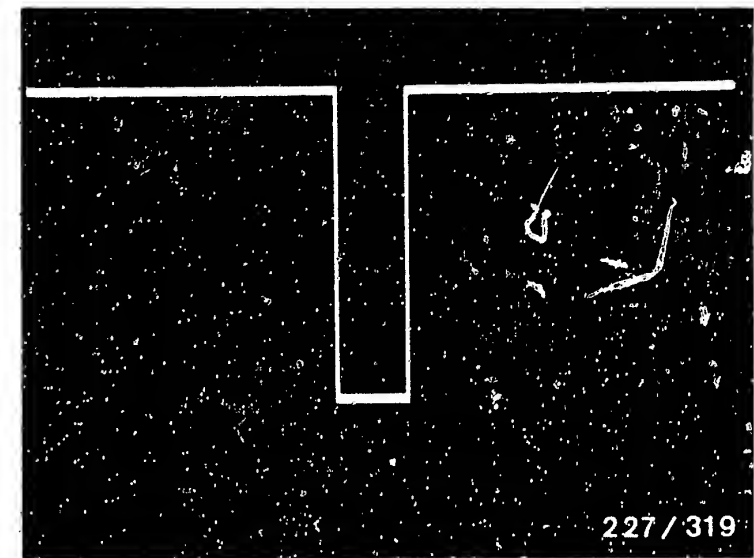
**D7**

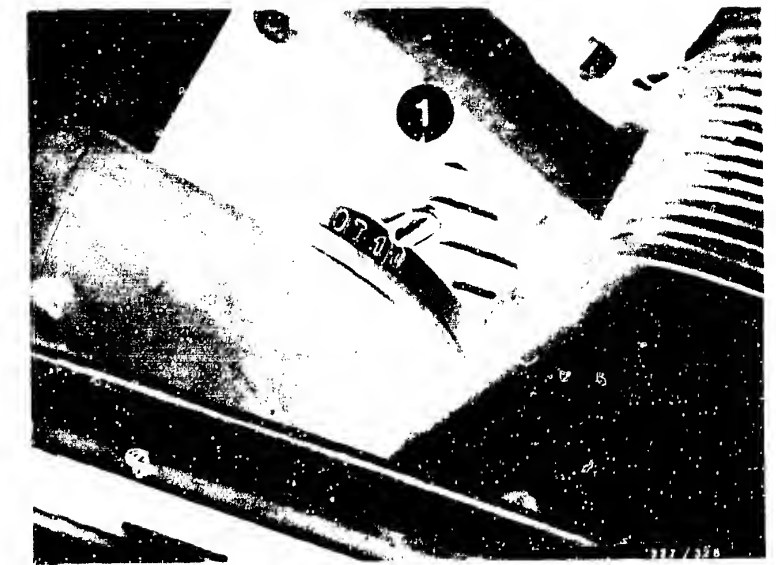
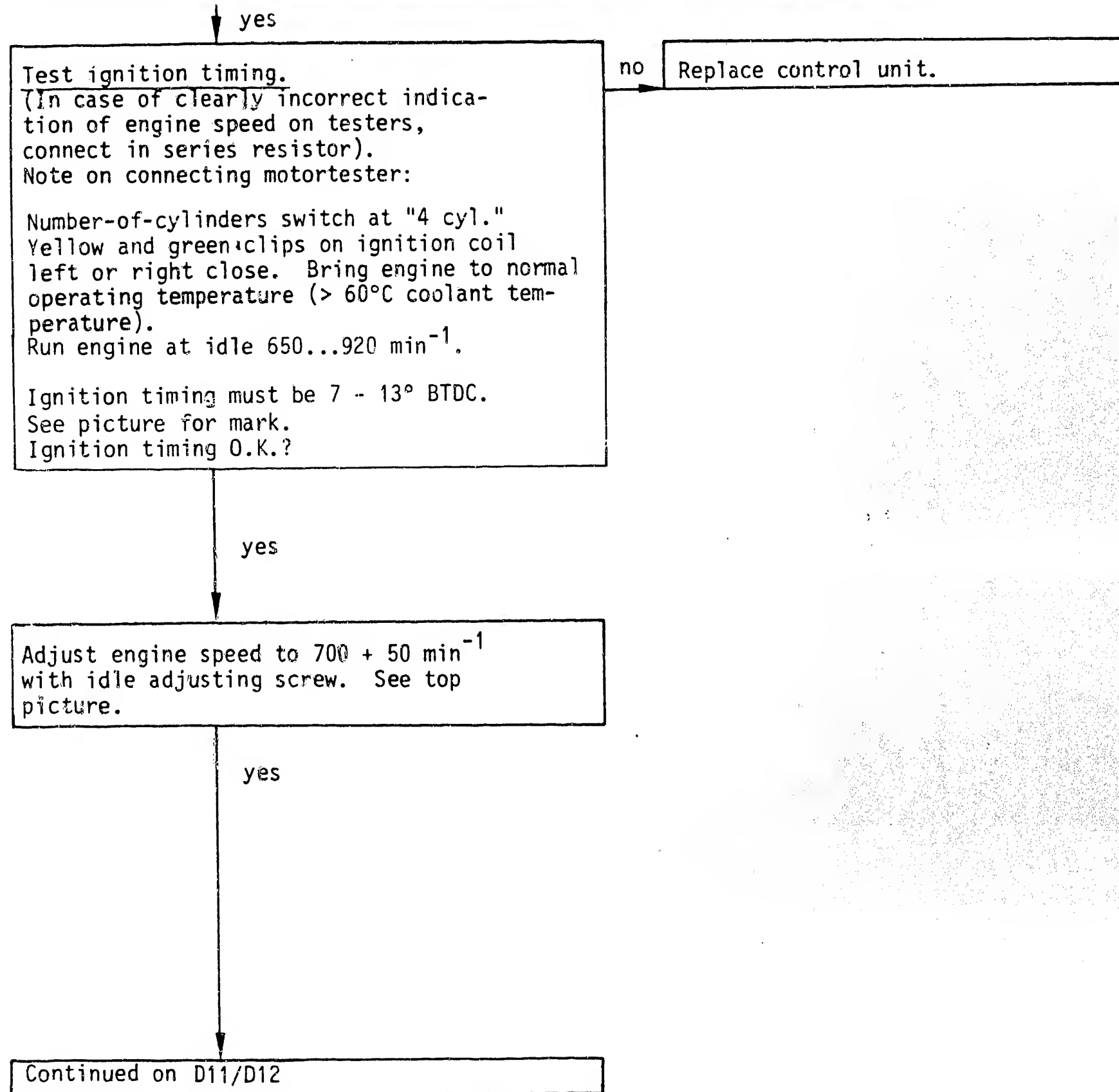
Trouble-shooting program  
Porsche



**D8**

Trouble-shooting program  
Porsche





1 = Ignition timing mark



yes

### Check operation of vacuum sensor.

1. Disconnect plug from throttle-valve switch plug connector. See arrow, top picture.

Disconnect vacuum hose from electronic-ignition control unit (arrow in center picture) and connect vacuum pump to disconnected vacuum hose.

See center picture.

Run engine at idle.

Pressure gauge must indicate approx. 600 mbar.

2. Disconnect vacuum pump from vacuum hose.

Run engine at idle.

Read off spark-advance angle.

Connect vacuum hose to electronic-ignition control unit.

The previously indicated spark-advance angle must move away in the "ADVANCE" direction.

Spark-advance angle moving away in "ADVANCE" direction?

no

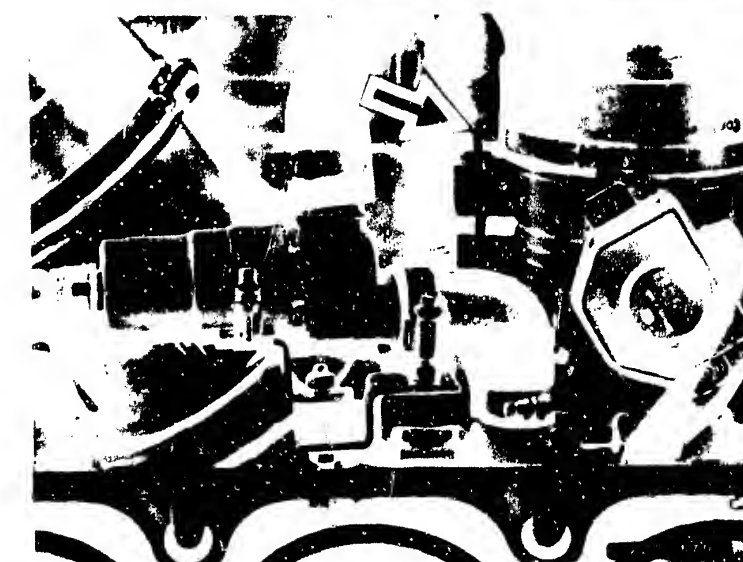
If there was no vacuum in test step 1, check for leaks in vacuum line between electronic-ignition control unit (arrow, center picture) and throttle-valve assembly vacuum port (arrow in bottom picture).

Eliminate leaks.

If there was vacuum in test step 1 and spark-advance angle did not move away in "ADVANCE" direction in test step 2, replace electronic-ignition control unit.

yes

Continued on D13/D14



**D11**

Trouble-shooting program

Porsche



**D12**

Trouble-shooting program

Porsche



↓ yes

Check trigger box power supply.  
Take off trigger-box cover.  
The following test must be performed at both trigger-box plugs.  
Push back rubber sleeve of trigger-box plug. Connect voltmeter to trigger-box plug term. 4 (+) and term. 2 (-).  
Run engine at idle.

Operate engine at idle.  
Measured voltage must be 12...14 V and must be no more than 2 V below battery voltage.  
Voltage O.K.?

no

Disconnect positive cable from battery.  
Switch on ignition.  
Check for contact resistance in cables from positive battery terminal to ignition coil term.15.  
Contact resistance max.0.5  $\Omega$   
(Take resistance of test lead /test prods into account).

Eliminate contact resistance.

yes

Test ignition coil power supply.  
The following test must be performed on both ignition coils. Connect voltmeter to ignition coil term. 15 and ground. Operate engine at idle. Measured voltage must be at least 10 V. Voltage O.K.?

no

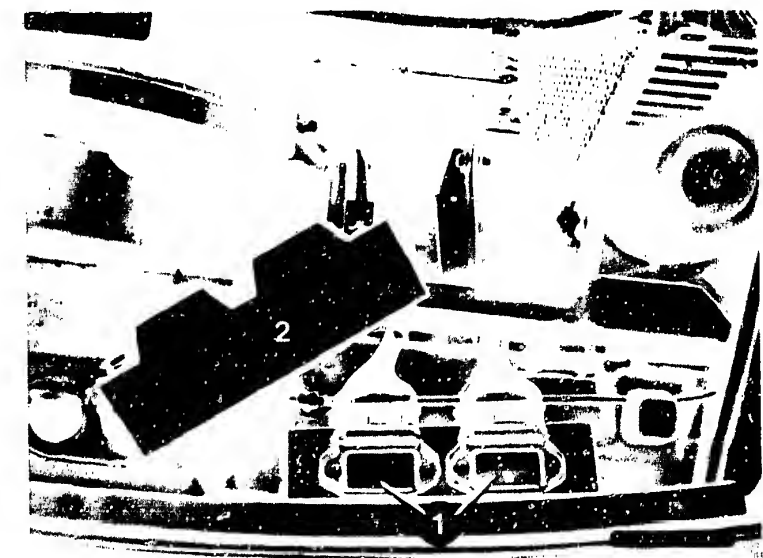
Disconnect negative and positive cables from battery. Remove trigger-box plug. Switch on ignition.

Check for contact resistance in cables from positive battery terminal to trigger-box plug term. 4 including cables from negative battery terminal to trigger-box plug term.2. Total contact resistance max. 0.5  $\Omega$  (take resistance of test lead/test prods into account).

Eliminate contact resistance.

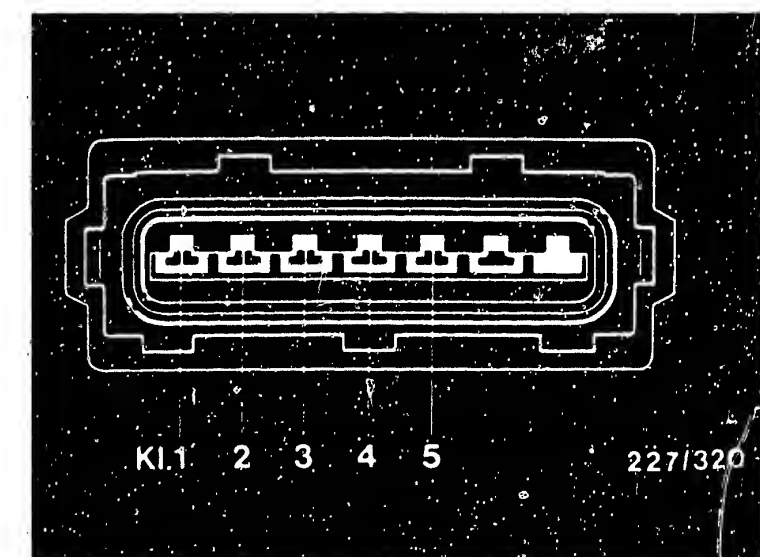
yes

Continued on D15/D16



1 = Trigger boxes  
2 = Cover

Trigger-box plug



↓ yes

Check primary voltage.

Remove protective caps from ignition coils. The following test must be performed on both ignition coils.

(If MOT series available) connect oscilloscope (e.g. MOT 201) together with pulse shaper 1 684 463 154 to ignition coil according to operating instructions.

Note: Incorrect reading without pulse shaper.

Allow engine to idle.

Measured primary voltage must be 295...365 V. See graph.

Voltage correct?

no

Disconnect lead term. 1 from ignition coil whose primary voltage was not O.K. . Disconnect both trigger-box plugs. Connect ohmmeter to disconnected lead from ignition coil term. 1 and, one after the other, to each trigger-box plug term. 1.

Replace the trigger box whose plug shows approx. 0  $\Omega$  (continuity) on ohmmeter.

yes

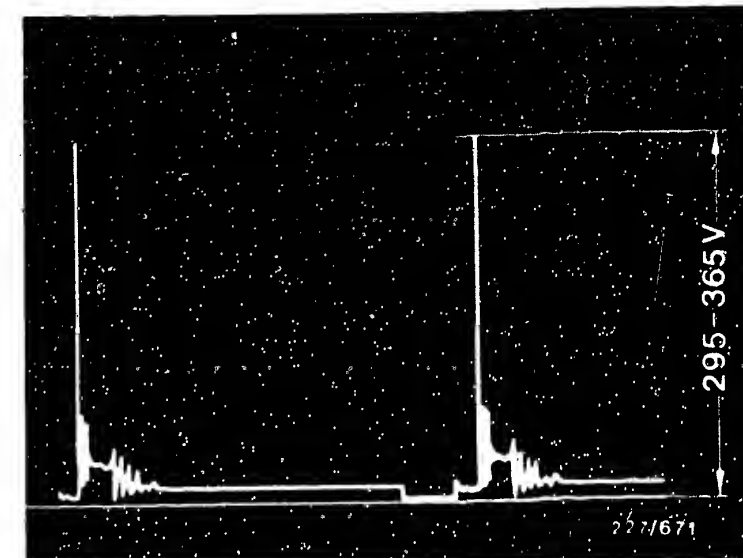
Ignition system O.K.

Test completed

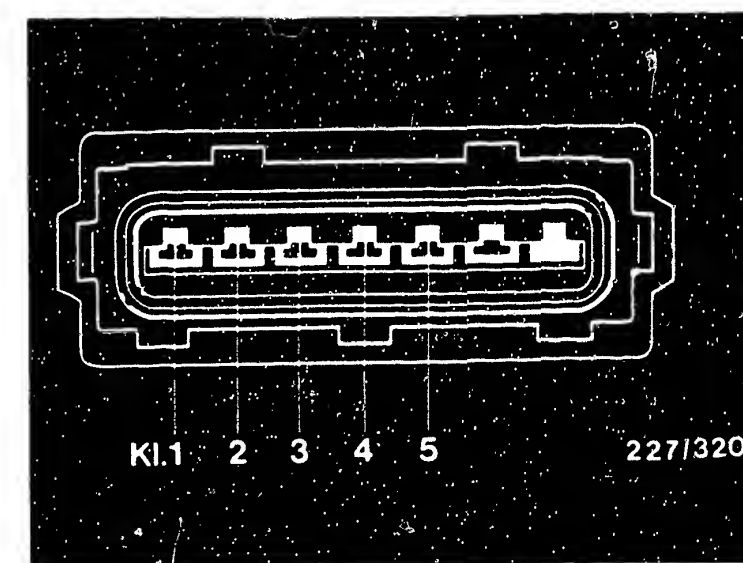
Tests starting at E 1 no longer necessary.

Note:

If customer complaint is not yet remedied, then check for further possible faults in the fuel system, or engine not mechanically O.K.



Trigger-box plug



**D 15**

Trouble-shooting program

Porsche



**D 16**

Trouble-shooting program

Porsche





No primary signal/no ignition  
spark

(Continued from C9/C10).

yes

Test trigger-box power supply.  
The following test must be performed  
on both trigger-box plugs. Discon-  
nect trigger-box plug. Connect  
voltmeter to trigger-box plug between  
term. 4 (+) and term. 2 (-).  
Switch on ignition. Voltmeter must  
indicate battery voltage.

no

Check for open circuit in cables and ter-  
minals from ignition and starting switch  
to trigger-box plug term.4 including ground  
cable term.2. Eliminate open circuit.

yes

Test primary circuits.  
The following test must be performed  
on both trigger-box plugs.  
Connect voltmeter to disconnected  
trigger-box plug between term. 1(+)and  
term. 2 (-). Switch on ignition.  
Voltmeter must indicate battery vol-  
tage.

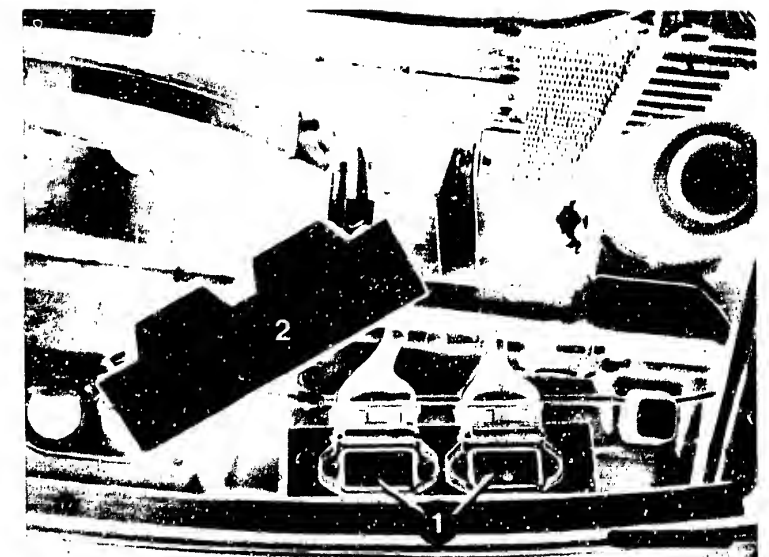
no

Check for open circuit in cable from igni-  
tion and starting switch to ignition coil  
term. 15, in the primary winding of the ig-  
nition coil, in the cable from ignition coil  
term. 1 to trigger-box plug term. 1 and in  
the ground cable term. 2.  
Eliminate open circuit.

Voltage O.K.?

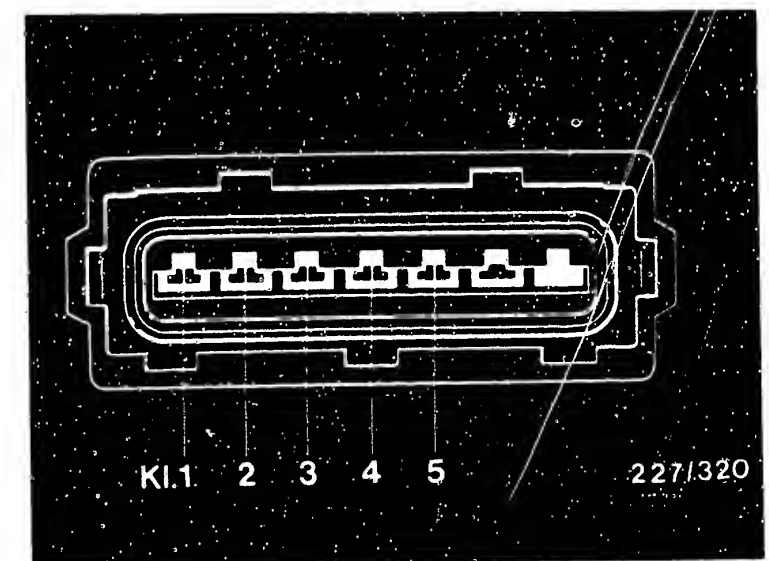
yes

Continued on E3/E4



1 = Trigger box  
2 = Cower

Trigger-box plug



E1

Trouble-shooting program  
Porsche



E2

Trouble-shooting program  
Porsche



↓ yes

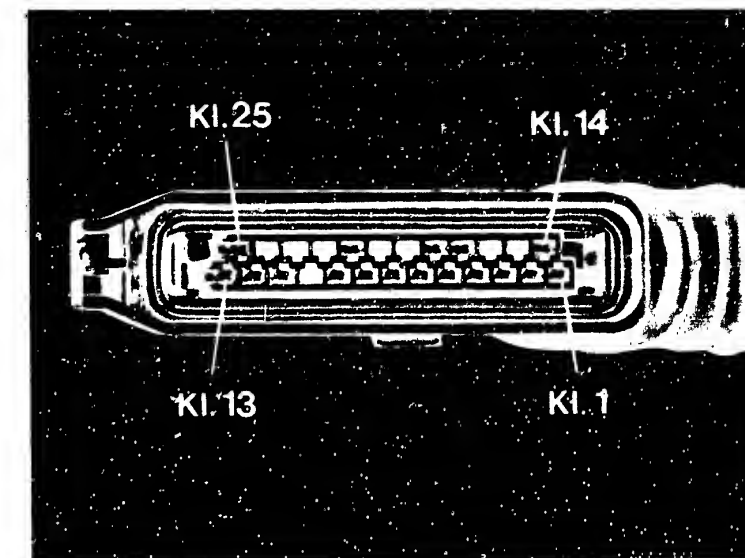
Test power supply to electronic ignition control unit.  
Turn back mat in front passenger footwell.  
Disconnect electronic ignition control-unit plug.  
See top picture.  
Connect voltmeter to disconnected electronic-ignition control-unit plug term. 25 (+) and term. 12 (-).  
Switch on ignition. Voltmeter must indicate battery voltage.

Voltage O.K.?

no

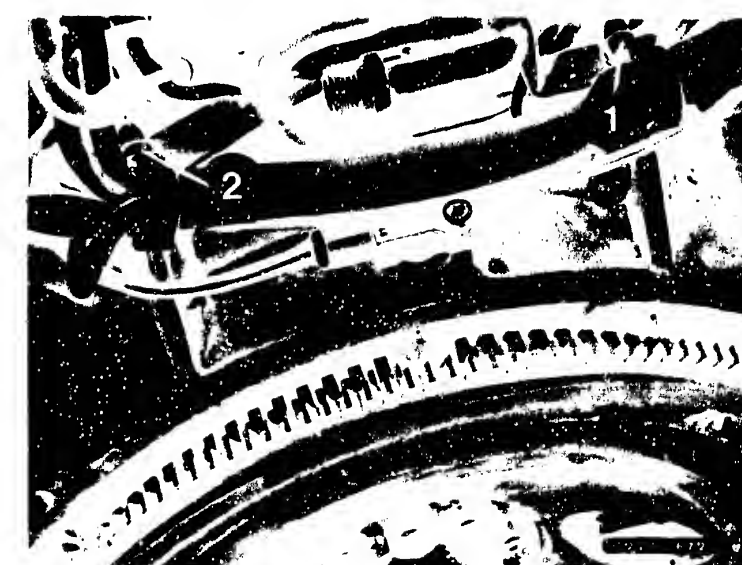
1. Switch off ignition.  
Connect ohmmeter to disconnected electronic-ignition control-unit plug term. 12 and ground lead for electronic-ignition control unit. See bottom picture.  
Ohmmeter must indicate approx. 0  $\Omega$  (continuity).  
Eliminate open circuit.

2. Disconnect power-supply relay.  
See center picture for central-electrics box, 1984 model year, bottom picture for 1985.  
Connect voltmeter to connection base term. 86 (+) and ground.  
Switch on ignition.  
Voltmeter must indicate battery voltage.



1 = Electronic ignition control-unit plug

1 = Ground point of electronic-ignition control unit  
2 = Ground point of Jetronic control unit



Continued on E9/E10

Continued on E5/E6

**E3**

Trouble-shooting program

Porsche



**E4**

Trouble-shooting program

Porsche





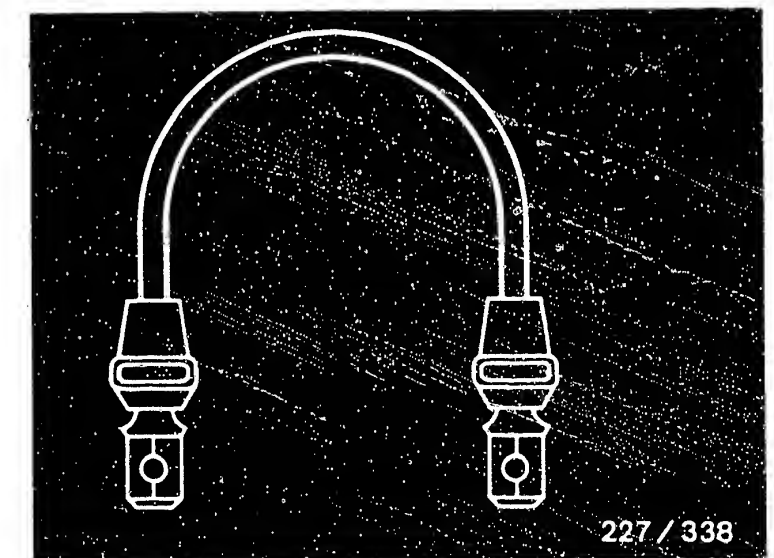
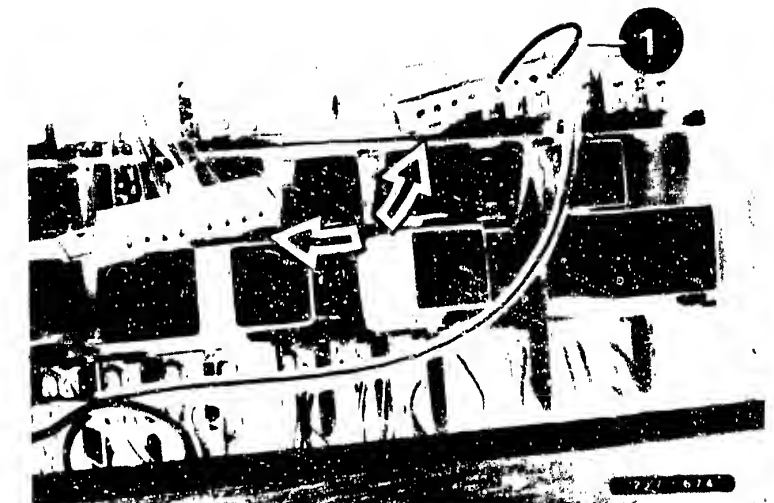
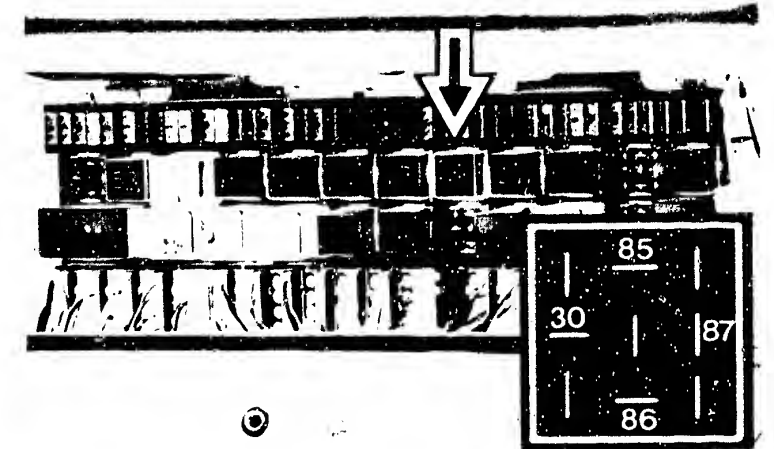
Continued

yes

2. Disconnect power-supply relay (central-electrics box). See top picture.  
Connect voltmeter to connection base term. 86 (+) and ground. Switch on ignition. Voltmeter must indicate battery voltage.  
If battery voltage not present, take apart 8-pin plug connector (behind central-electrics box) of alarm control unit and jump sockets 1 (red/black lead) and 4 (yellow lead) with auxiliary lead. See center picture, Item 1.  
If battery voltage still not present, eliminate open circuit between positive battery terminal and connection base term. 86. If battery voltage present, check operation of alarm control unit. Eliminate fault.
3. Connect voltmeter to connection base term. 85 (-) and term. 86 (+).  
Switch on ignition.  
Voltmeter must indicate battery voltage.  
If battery voltage not present, eliminate open circuit in lead term. 85.
4. Connect connection base term. 30 and term. 87 with auxiliary lead. See bottom picture.

Continued on E9/E10

Continued on E7/E8



227 / 338

E5

Trouble-shooting program  
Porsche



E6

Trouble-shooting program  
Porsche

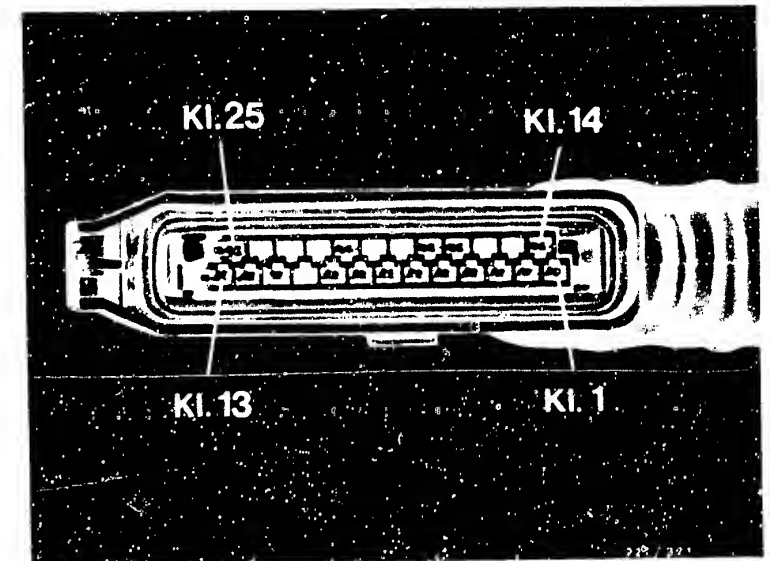


Continued

Connect voltmeter to electronic ignition control-unit plug term. 25 and ground. See top picture. Voltmeter must indicate battery voltage. If battery voltage not present, eliminate open circuit between positive battery terminal and connection base term. 30 or between connection base term. 87 and electronic ignition control-unit plug term. 25.

Central-electrics box 1984 model year in center picture, 1985 bottom picture.

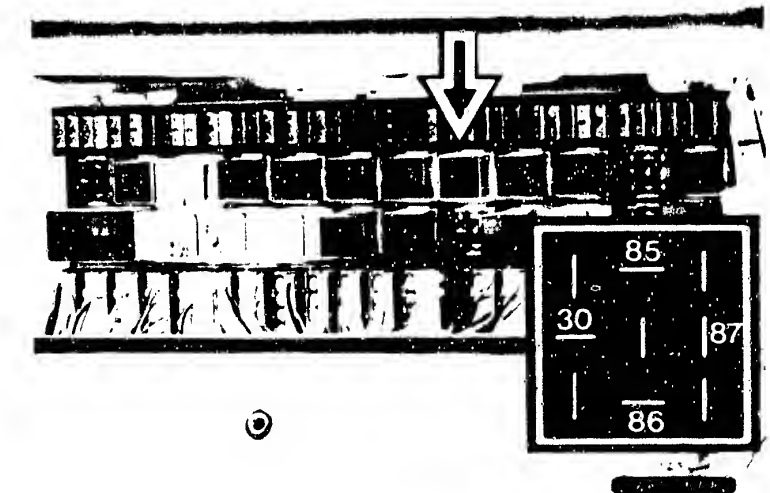
If points 1, 2 3 and 4 O.K., then replace power-supply relay.



Electronic-ignition control-unit plug

yes

Ignition power-supply relay



Continued on E9/E10

E7

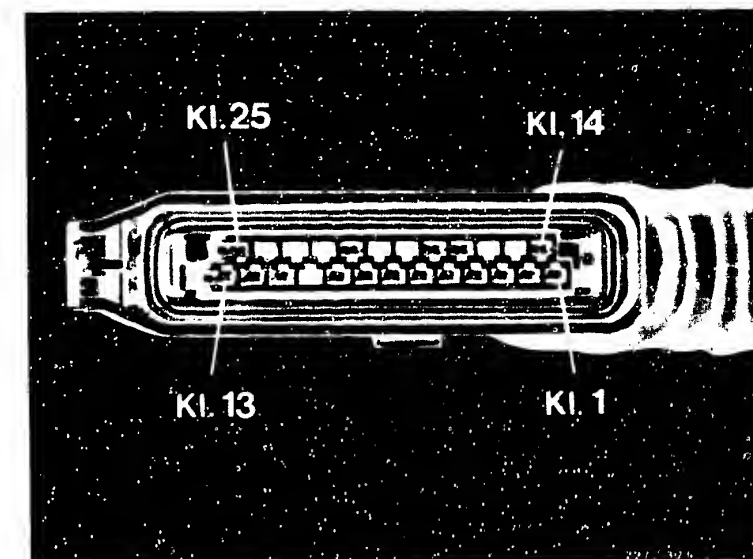
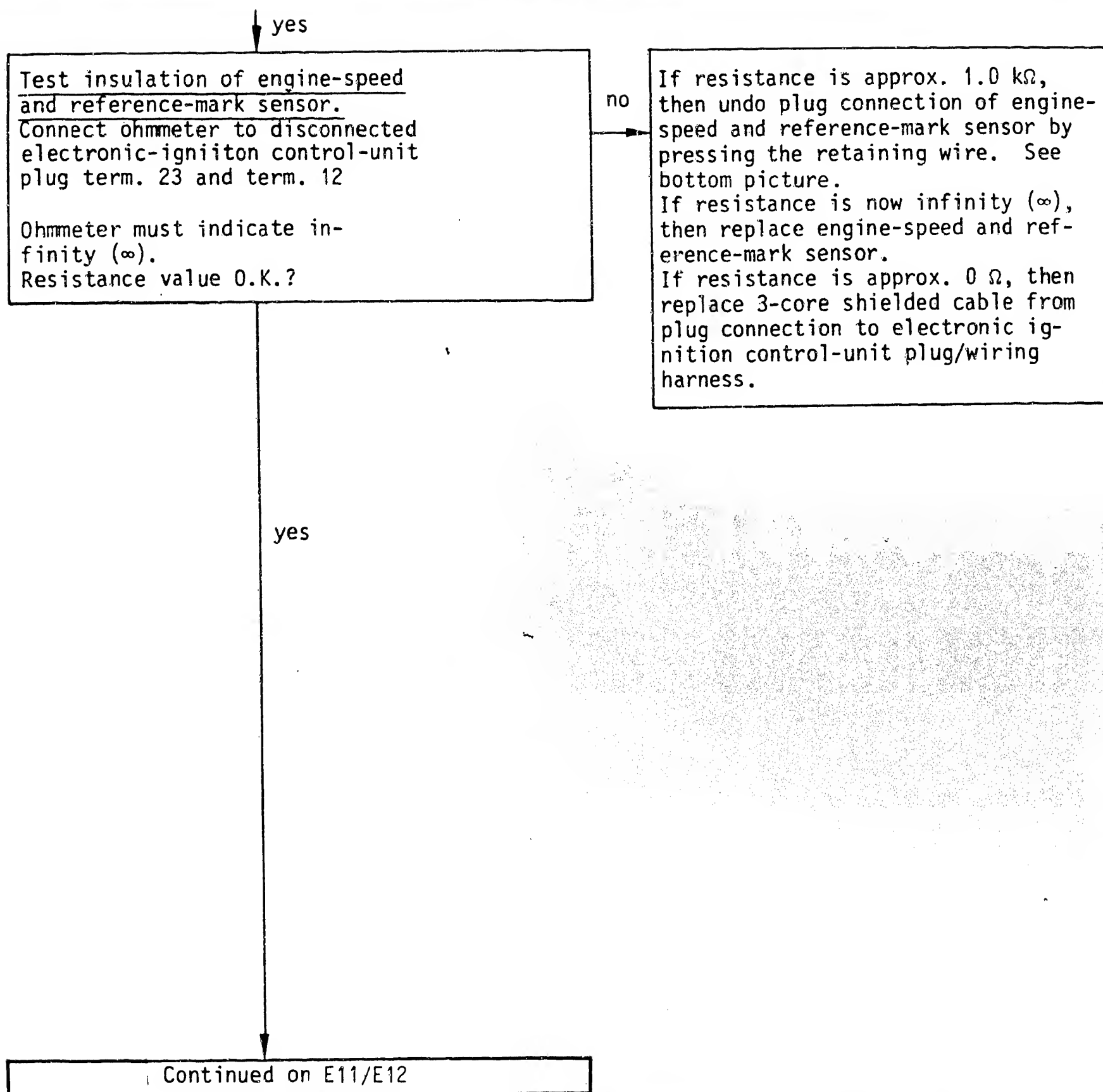
Trouble-shooting program  
Porsche



E8

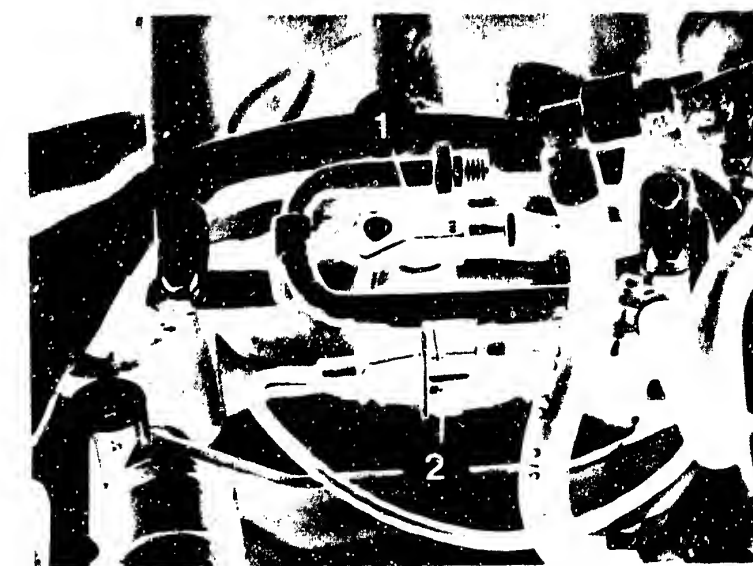
Trouble-shooting program  
Porsche





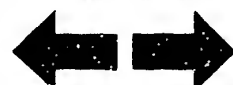
Electronic ignition control-unit plug

- 1 = Engine-speed and reference-mark sensor
- 2 = Plug connector of engine-speed and reference-mark sensor



**E9**

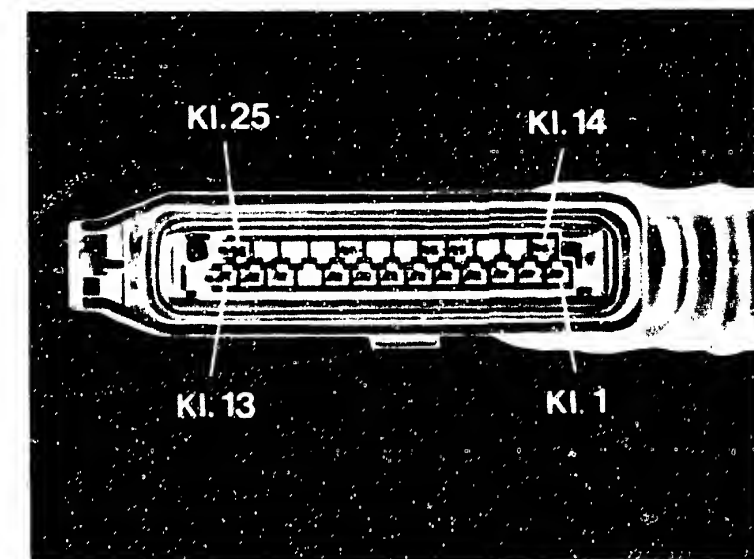
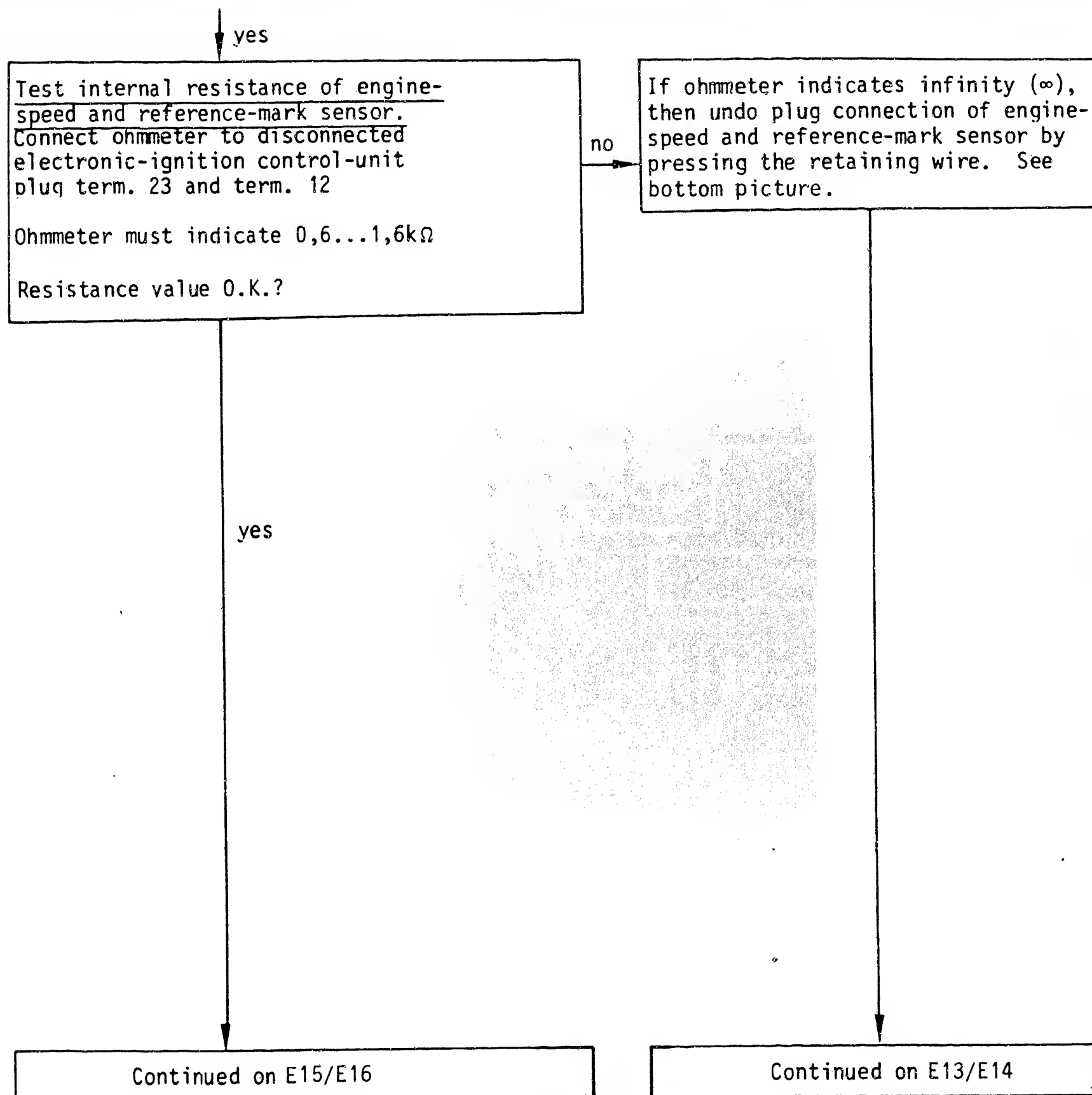
Trouble-shooting program  
Porsche



**E10**

Trouble-shooting program  
Porsche





Electronic ignition control-unit plug

- 1 = Engine-speed and reference-mark sensor
- 2 = Plug connector of engine-speed and reference-mark sensor



**E11**

Trouble-shooting program  
Porsche



**E12**

Trouble-shooting program  
Porsche



Continued

Connect ohmmeter consecutively to:

Electronic  
ignition  
control-unit  
plug

Plug of engine-  
speed and ref-  
erence-mark sensor

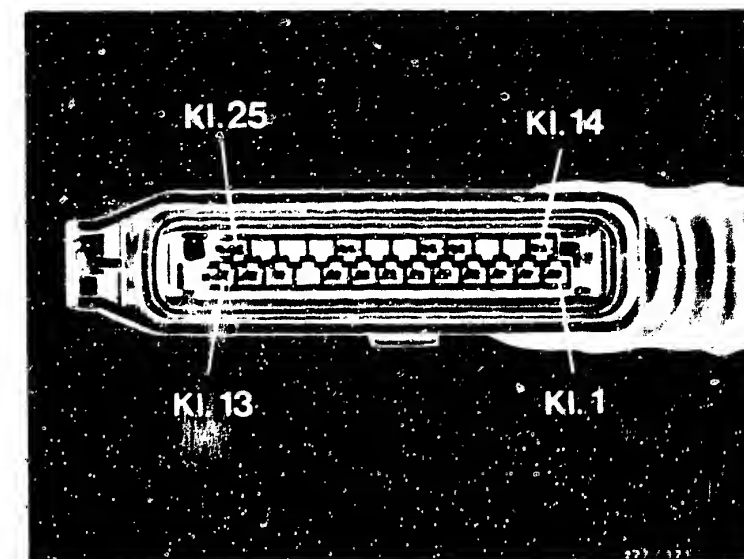
Term. 7  
Term. 19

and Term. 7  
and Term. 19

Ohmmeter must now indicate approx.  
0  $\Omega$  (continuity).

Eliminate open circuit.

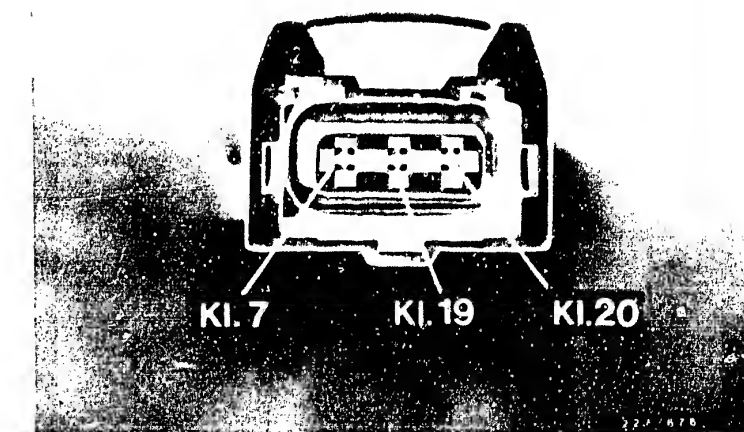
If there was no open circuit, replace  
engine-speed and reference-mark  
sensor.



Electronic ignition control-unit  
plug

yes

Plug of engine-speed and reference-  
mark sensor



Continued on E15/E16

**E13**

Trouble-shooting program  
Porsche

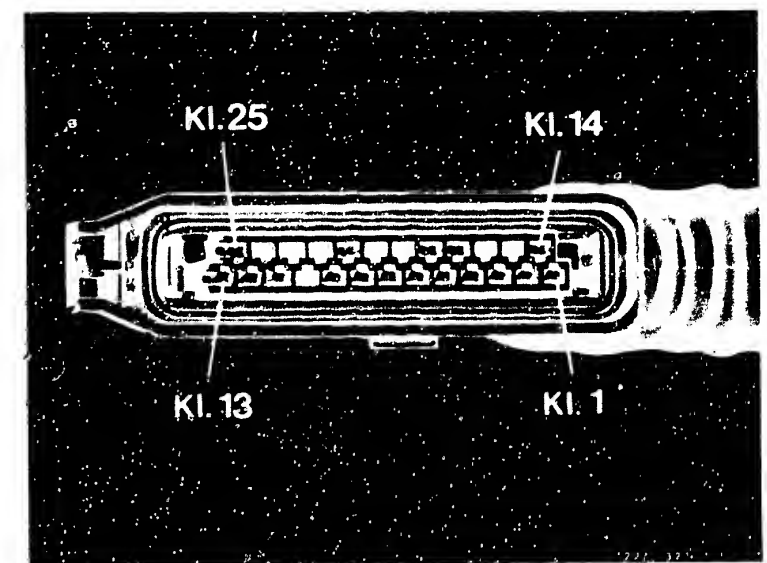
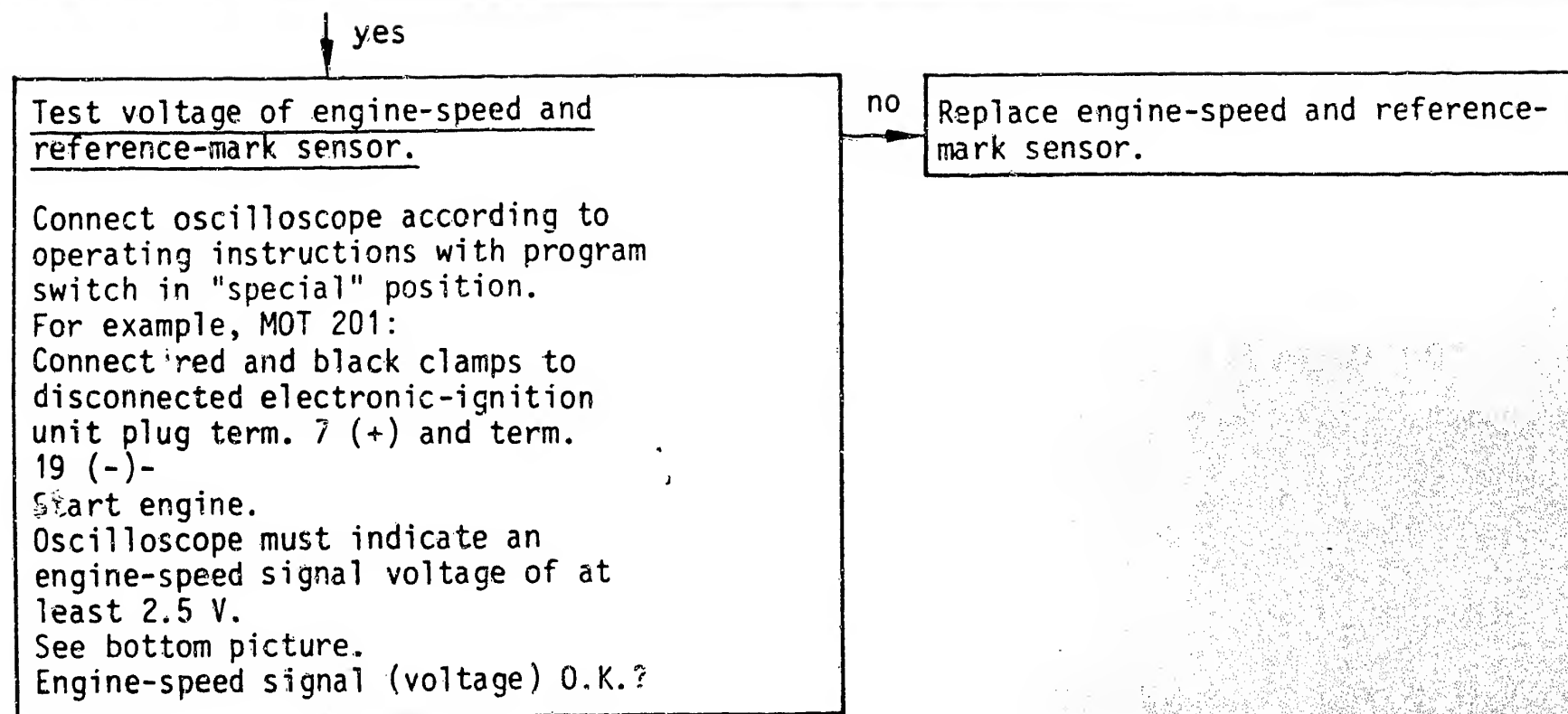


**E14**

Trouble-shooting program  
Porsche

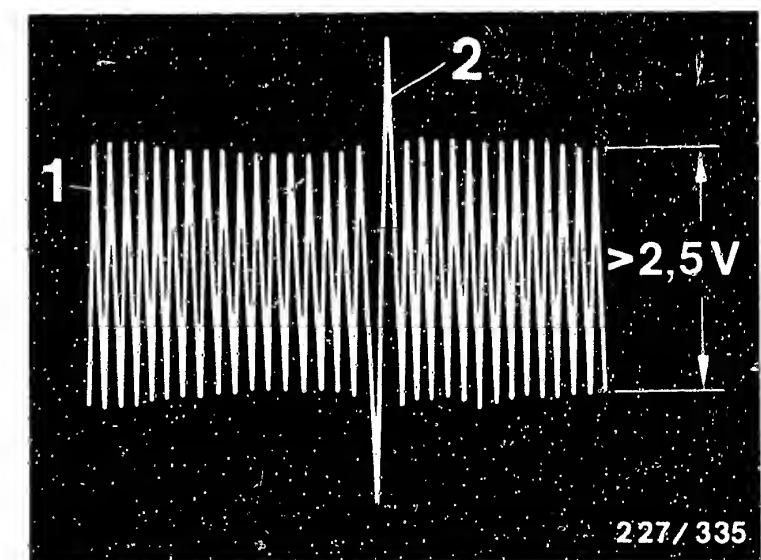






Electronic ignition control-unit plug

1 = Engine-speed signal  
2 = Reference-mark signal



**E15**

Trouble-shooting program

Porsche

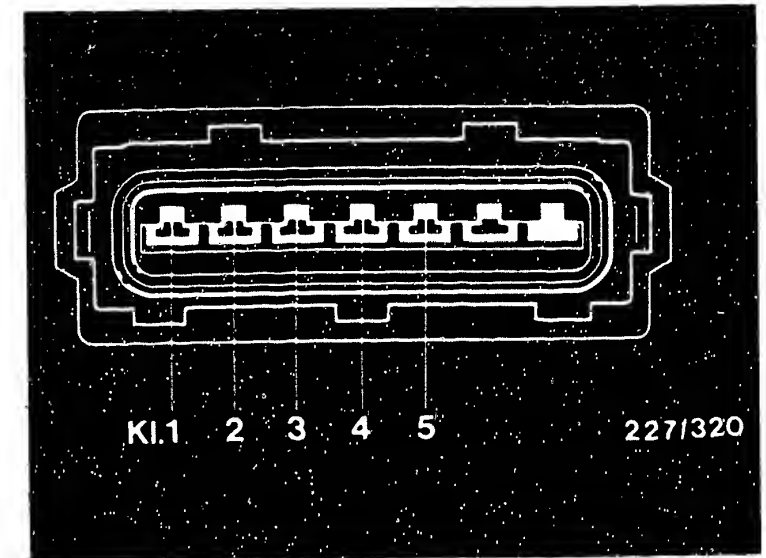
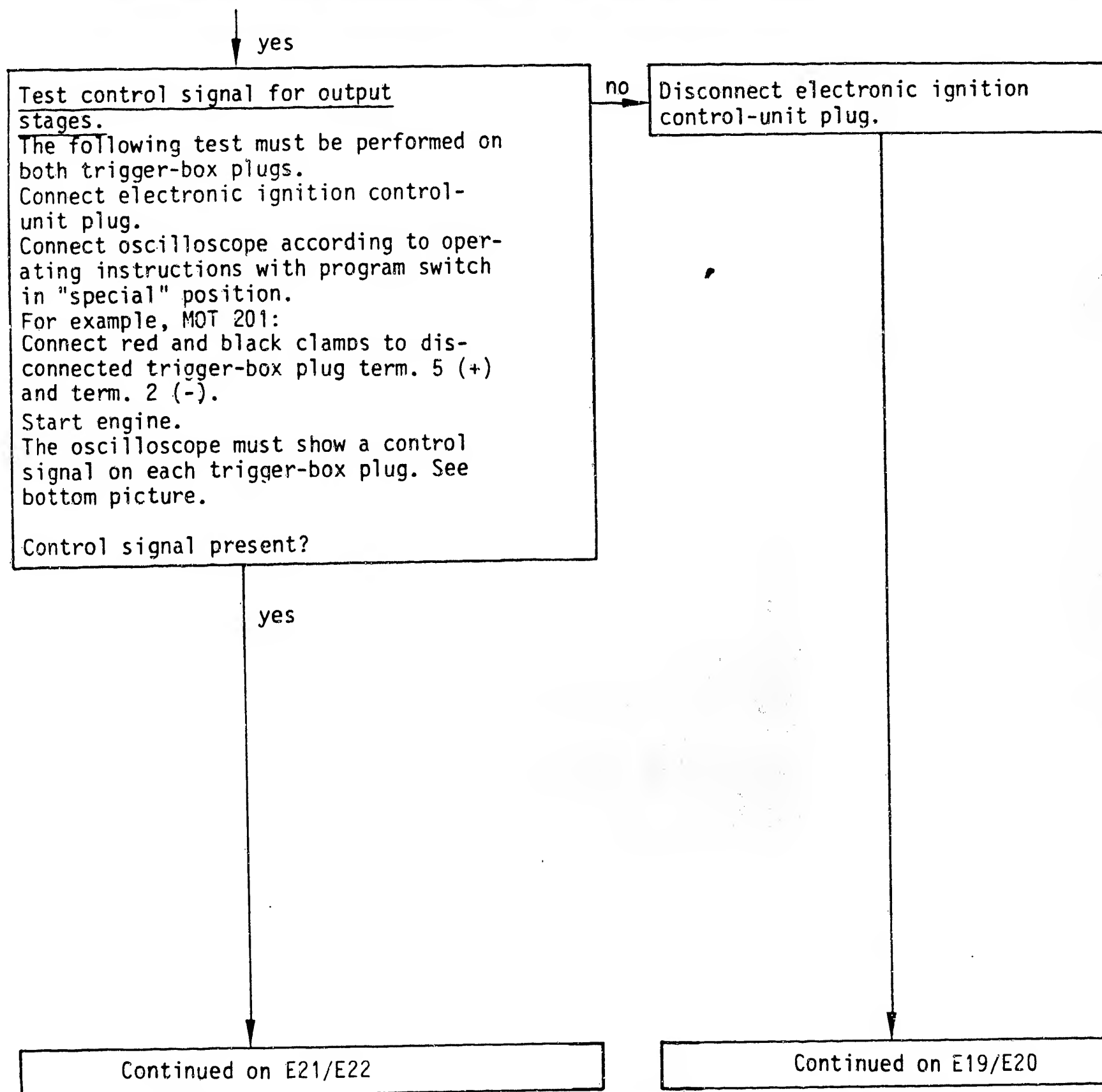


**E16**

Trouble-shooting program

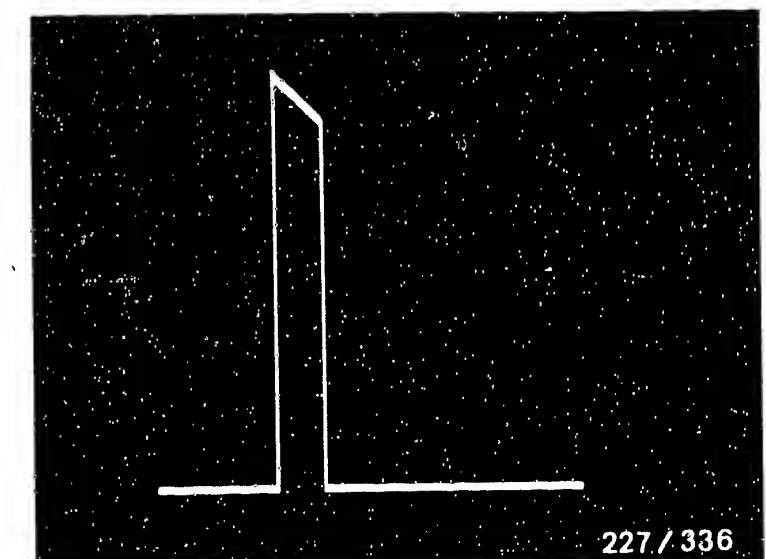
Porsche





Trigger-box plug

Control signal



**E17**

Trouble-shooting program  
Porsche



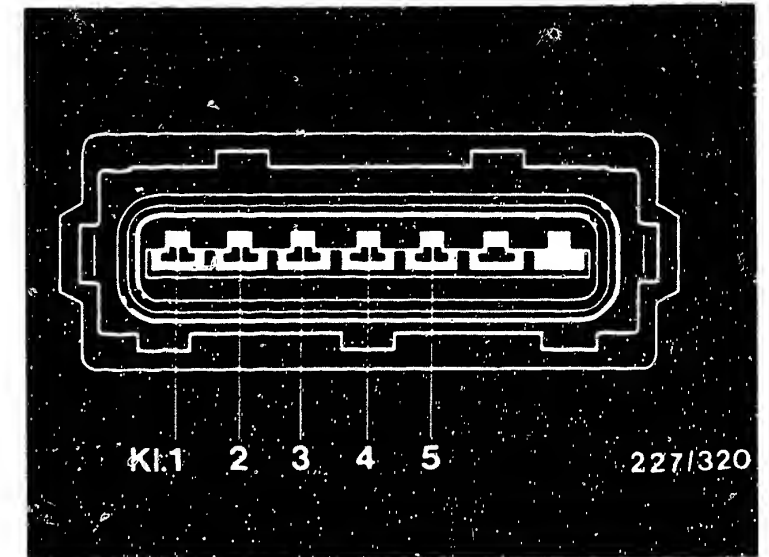
**E18**

Trouble-shooting program  
Porsche



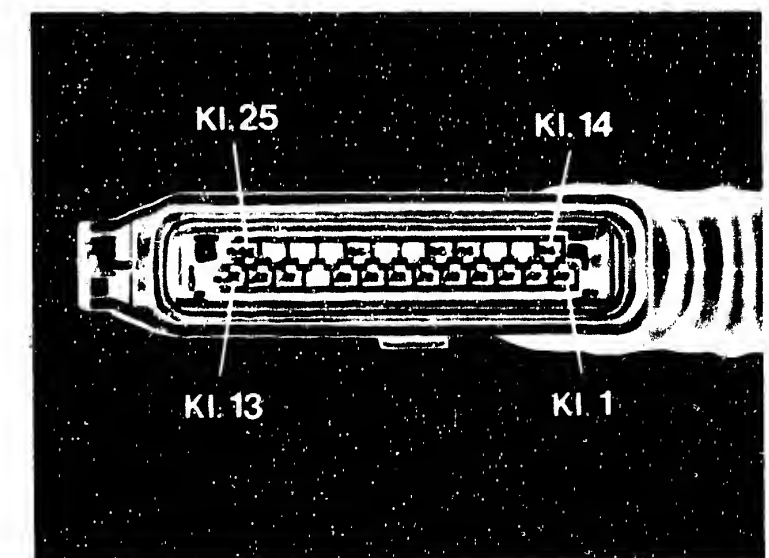
Continued

On the trigger-box plug for which there is no control signal: Connect ohmmeter to trigger-box plug term. 5 and, one after the other, to electronic ignition control-unit plug term. 1 and term. 13. Ohmmeter must indicate approx. 0  $\Omega$  (continuity) either for term. 1 or term. 13 of electronic ignition control-unit plug.  
If continuity is not indicated, eliminate open circuit between trigger-box plug and electronic ignition control-unit plug.  
If there is continuity, replace control unit.



Trigger-box plug

Electronic ignition control-unit plug



yes

Continued on E21/E22

**E19**

Trouble-shooting program

Porsche



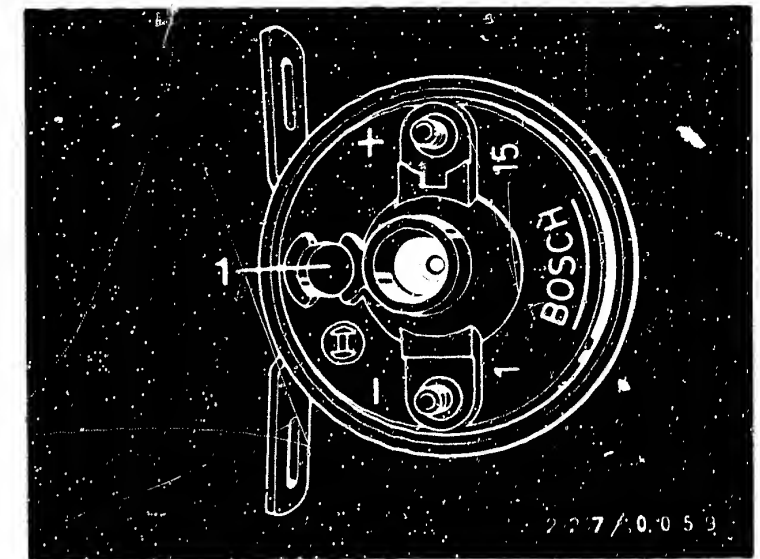
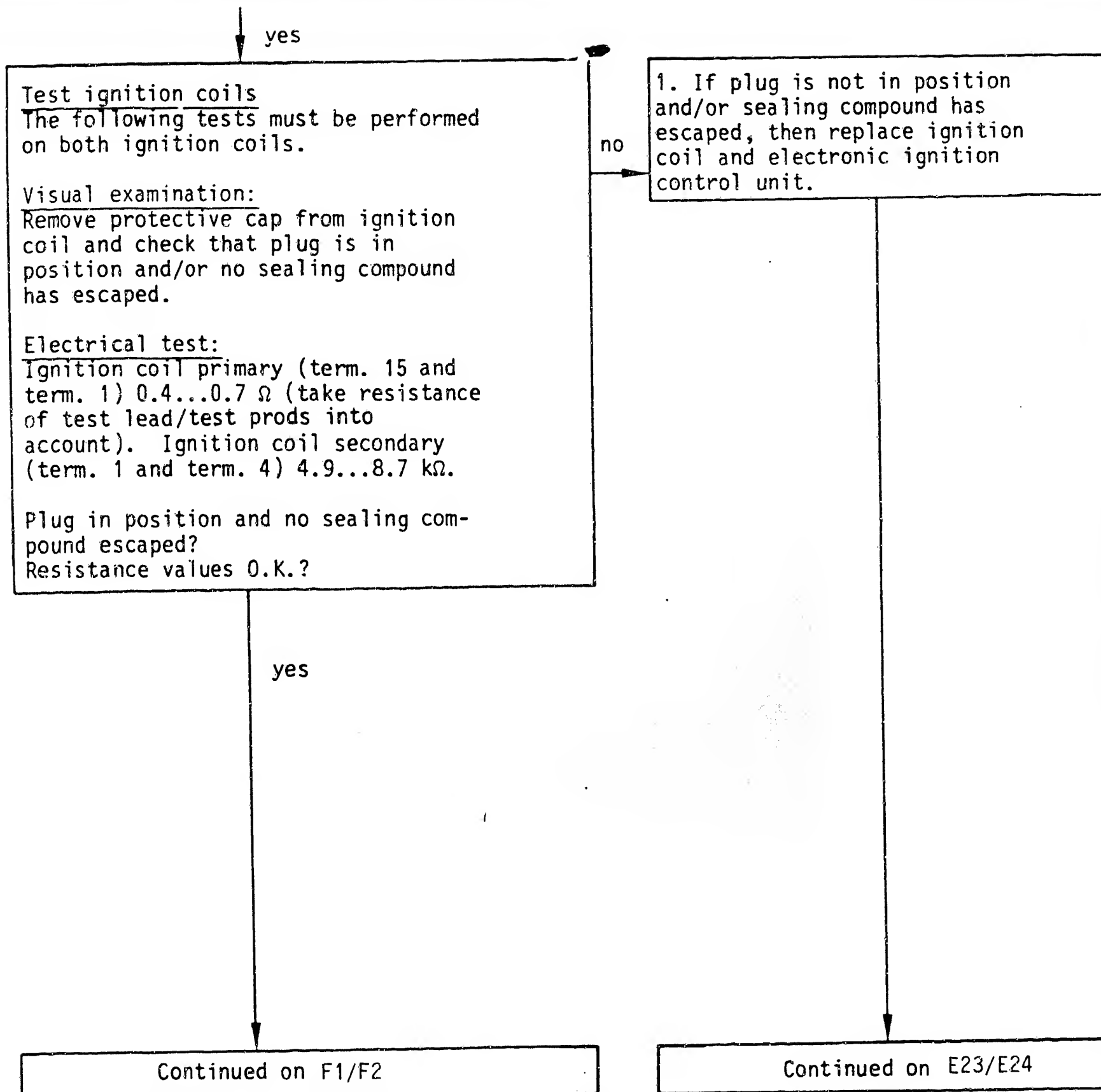
**E20**

Trouble-shooting program

Porsche



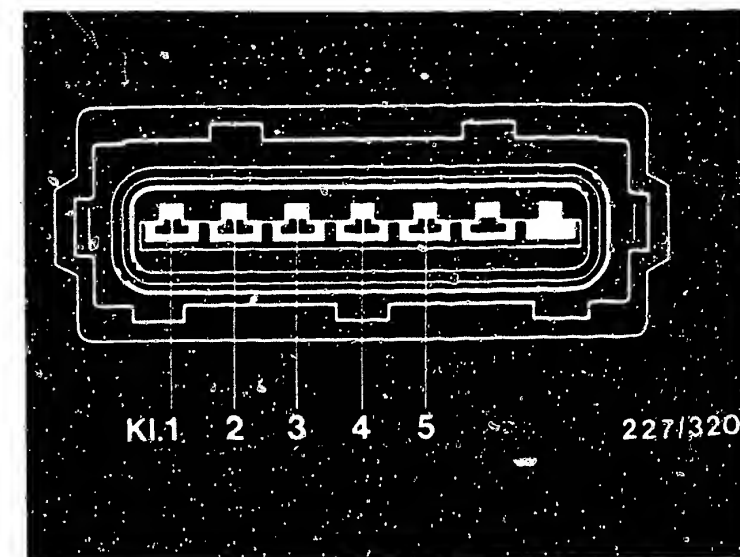




1 = Plug

Continued

2. Disconnect lead term. 1 of defective ignition coil (plug not present, sealing compound escaped). Connect ohmmeter to disconnected lead from ignition coil term. 1 and, one after the other, to disconnected trigger-box plugs term. 1. Replace trigger box whose plug indicates approx.  $0\ \Omega$  (continuity) on ohmmeter.
3. If resistance values are not O.K., then replace ignition coil.



Trigger-box plug

yes

Continued on F1/F2

**E23**

Trouble-shooting program  
Porsche



**E24**

Trouble-shooting program  
Porsche

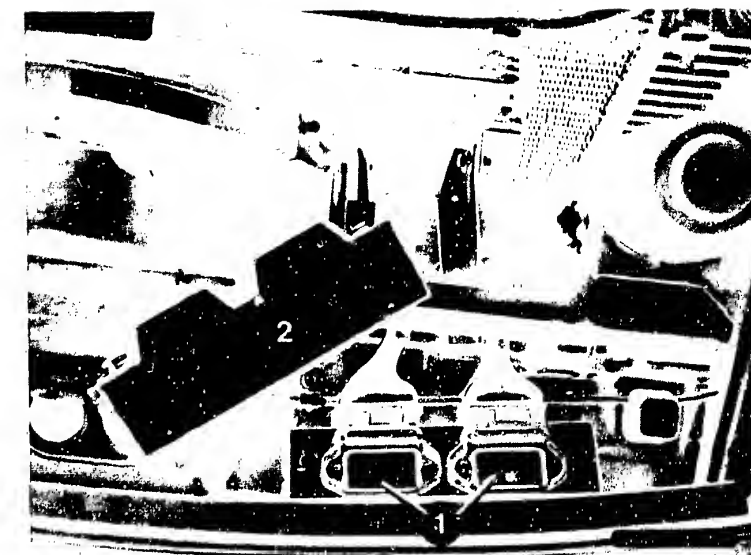


yes  
 Connect both trigger-box plugs.  
 Primary signal now present or  
 ignition sparks across spark  
 gap?

yes  
 Testing completed  
 Tests from C11 not necessary.  
 Note:  
 If customer complaint still  
 not remedied, further pos-  
 sible faults are in the fuel  
 system, or engine not  
 mechanically O.K.

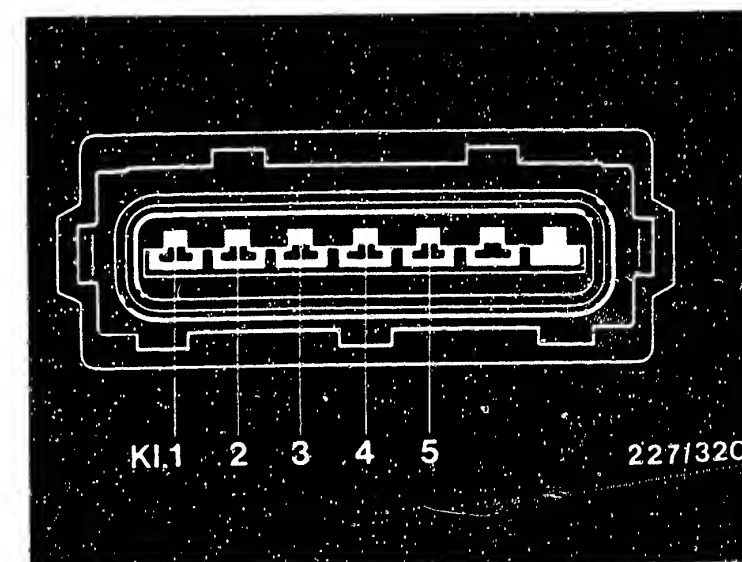
Disconnect both trigger-box plugs.  
 Disconnect lead term. 1 from the ig-  
 nition coil from which there was no  
 primary signal/ignition spark.

Connect ohmmeter to disconnected lead  
 from ignition coil term. 1 and, one  
 after the other, to trigger-box plug  
 term. 1.  
 Replace trigger box whose plug in-  
 dicates approx. 0  $\Omega$  (continuity) on  
 ohmmeter.



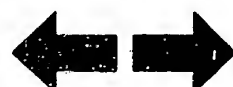
1 = Trigger boxes  
 2 = Cover

Trigger-box plug



**F1**

Trouble-shooting program  
 Porsche



**F2**

Trouble-shooting program  
 Porsche



# After-sales Service

## Technical Bulletin

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22

### Danger of Accident on Semi-conductor Ignition Systems

VDT-I-227/102 B

11.1976

Please be sure to pass this bulletin on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufactures starting to equip their vehicles with semi-conductor ignition systems as original equipment. In most cases the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" parts or contacts (whether on the primary side or the secondary side) can prove fatal.

In this connection we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems the ignition is to be switched off. Included in such work are the following operations:

- Connection of engine testing equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of ignition system parts (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.).

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

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Technical Bulletin

Porsche

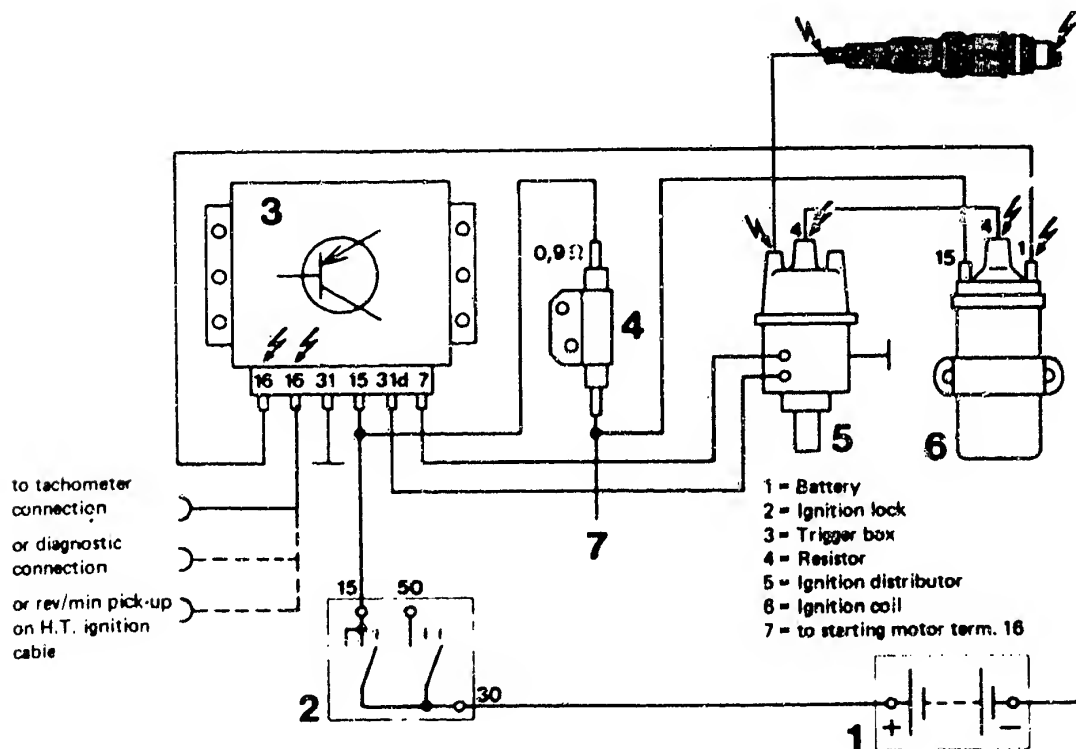


In addition, in the case of the capacitor-discharge ignition system (CDI), danger of accident is also present under the following circumstances:

- Operation of the trigger box without the ignition transformer.
- At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Below is a typical terminal diagram of a semi-conductor ignition system, the danger points are marked with red high-voltage arrows. We would point out that all semi-conductor ignition systems, even the older ones, are to be regarded as dangerous in the sense as defined by this bulletin.

Please address any queries or comments concerning the contents of this publication to our representative in your country.



Terminal diagram

# After-sales Service

## Technical Bulletin

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EFFECTS OF ELECTRICAL AND ELECTRONIC  
SYSTEMS ON HEART PACEMAKERS

VDT-I-227/107 En  
1.1981

e.g. ignition systems, Jetronic, Motronic, ABS

Please ensure without fail that this Bulletin is passed on to your employees for their attention!

We have often been asked by some of our customers whether or not patients with heart pacemakers are endangered in any way by ignition systems. This theme was recently the subject of an examination carried out by the Ignition System Development Department of Robert Bosch GmbH in conjunction with Dr. Thull, lecturer at the Central Institute for Biomedical Technology at the University of Erlangen-Nürnberg and Biotronic GmbH & Co. of Berlin, a manufacturer of heart pacemakers. The magazine "Biomedizinischen Technik" (5/80) listed the results.

The most important discoveries in this practice can be summarized from the examination report as follows:-

1. Heart pacemakers corresponding to the latest state of the art are not affected by radiation (electromagnetic fields) from ignition systems.
2. With a stationary engine and the ignition switched off the heart pacemaker is not affected by any part of the ignition system, even when unintentionally touched. Maintenance work in the engine compartment, for example, can then be carried out without any danger.
3. With the engine running or stationary with the ignition switched on, touching current-carrying parts of the ignition system, as well as parts of any other electrical system, presents a certain danger for everybody. The heart pacemaker can here be affected under certain conditions (voltage, current and frequency).  
Patients with heart pacemakers should therefore at all costs avoid touching current-carrying parts of electrical systems.
4. Furthermore, patients with heart pacemakers are more inclined to psychic shock effects than other people, even when they receive just a harmless electric shock, because many such patients are conscious of the increased danger to the cardiac activity.

We therefore consider it inadvisable for patients with heart pacemakers to be employed in workshops or on vehicles where ignition systems are being tested or repaired. If any members of your staff have heart pacemakers please carry out the necessary measures.

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**N3**

Technical Bulletin

Porsche



We would like to add that heart pacemakers are not expected to be affected in any way by interference from other electronic products and systems which we manufacture, such as the Antiskid System (ABS), Jetronic, Motronic, because the much greater radiation intensity of the ignition systems examined in normal use has not caused any interference to heart pacemakers corresponding to the latest state of the art.

If you should receive questions on this matter from customers, please inform them accordingly.





# After-sales Service

## Technical Bulletin

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### BREAKERLESS TRANSISTORIZED IGNITION SYSTEM

22

#### Warranty note

VDT-I-227/103 En  
3.1979

Hybrid construction trigger boxes  
0 227 100 100 for ignition distributor  
with Hall generator (TCI-h)  
0 227 100 102 for ignition distributor  
with induction-type  
pulse generator (TCI-i)

Apart from the well-known TCI trigger boxes 0 227 100 0.., trigger boxes of hybrid construction have been fitted as standard since 9.78 (Fig. 1).

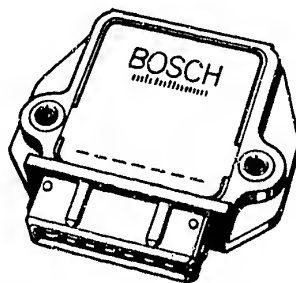


Fig. 1

#### Warranty procedure

If the complaints are justified, all these hybrid trigger boxes are to be sent, along with completed warranty documents, to your authorized representative for forwarding to the following address:

ROBERT BOSCH GMBH  
KH/LAV - Auspackraum

zur Weiterleitung an K1/VAK 21  
D-7000 Stuttgart 30

This instruction remains valid until further notice.

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**N5**

Technical Bulletin  
Porsche



# After-sales Service

## Technical Bulletin

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### NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En

1.1983

The introduction of new ignition systems has made it necessary to reclassify all designations.

The designations listed below will be used immediately in KH workshop and sales literature.

Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Coil ignition	SZ (CI)	-----	Mechanical (breaker points)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized coil ignition	TSZ-K (TCI-c)	K=breaker-triggered	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Trigger box with conventional circuit techniques	TSZ-I* (TCI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
	TSZ-H	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized ignition	TZ-I* (TI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
(Trigger box in Hybrid technique)	TZ-H* (TI-h)	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)

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**N6**

Technical Bulletin

Porsche



Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Breakerless semiconductor ignition with or without knock control	EZ EZ-K	- K=Knock control	Electronic (trigger box or control unit)	Electronic (control unit)	Mechanical (ignition distributor or high-voltage distributor)
Distributorless ignition with or without knock control	VZ VZ-K	- K=Knock control	Electronic (control unit)	Electronic (control unit)	Electronic (dual-spark ignition coil, or 1 ignition coil for each spark plug)

\*Note: The ignition system can also be equipped with a DLS unit (digital idle stabilization) or with an ELS unit (electronic idle stabilization) or with an ESV unit (electronic ignition retardation).



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

INCORRECT DISPLAY OF ROTATIONAL SPEED AND  
DWELL ANGLE ONLY WITH TRIGGER BOXES  
0 227 100 ... (TCI-i, TCI-h) WITH CURRENT  
LIMITATION

VDT-I-Gen. 030 En  
6.80  
Supersedes Ed. 3.80

For additional information see VDT-I-Gen. 032 En

### 1. General

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle when testing the ignition system. However, there is no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Incorrect displays may occur with the testers listed below:

MOT	001.00}	Rotational-speed	KTE	001.00
	001.01}	display O.K. with these		001.02
	001.02	testers		001.03
	001.04			
	002.00			

By now, the following vehicles may be fitted with breakerless ignition systems with current limitation:

Audi	(Bosch/Fairchild-ignition system)	Mazda	(Mitsubishi ignition system)
BMW	(Bosch ignition system)	Mitsubishi	(Mitsubishi ignition system)
Citroen	(Delco ignition system)	Nissan-Datsun	(Hitachi ignition system)
Fiat	(Delco ignition system)	Peugeot	(Bosch ignition system)
Ford	(Delco ignition system)	VW	(Bosch/Fairchild ignition system)
General-Motors	(HEI-ignition system)		Bosch transistorized ignition system for retrofitting 0 227 100 920

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**N8**

Motor Vehicle Service Information

Porsche



## 2. Test instructions

### 2.1 Rotational speed

Incorrect rotational-speed display can be recognized as follows:

If one starts at the idle speed and slowly increases the engine speed, then the incorrect display can be recognized by an abrupt reduction in the rotational-speed display (e.g. from 2400 min<sup>-1</sup> to 1200 min<sup>-1</sup>).

It is, however, possible to attain correct rot.-speed measurements as follows:

Connect a ballast resistor of 0.9 or 1.0 Ohm (see Fig.) in series in the line to term. 15 of the ignition coil (take care not to cause a short circuit). After the rotational-speed measurement, the ballast resistor must be removed (otherwise starting difficulties and misfiring). Connect tester as per operating instructions.

### Suggestion for user manufacture

Required parts:

- 1 ballast resistor 0.9 Ohm  
or
- 1 ballast resistor 1.0 Ohm
- 2 blade receptacles e.g.  
approx. 0.2 m cable, 1.5 mm<sup>2</sup> e.g.
- 2 insulated clips

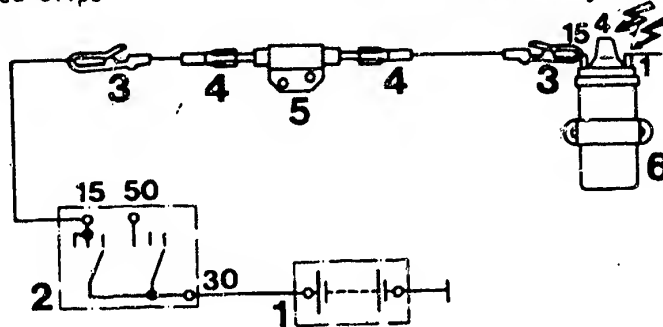
Part No. 0 227 900 002

Part No. 0 227 900 101

Part No. 1 901 355 881

Part No. 6 210 150 150

Commercially available



- 1 = Battery
- 2 = Ignition switch
- 3 = Clips

- 4 = Blade receptacle
- 5 = Ballast resistor
- 6 = Ignition coil

⚡ approx. 400 V

⚡ approx. 25 kV

### 2.2 Dwell angle

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.

### 2.3 Ignition point

Is displayed correctly. Connect tester as per operating instructions.



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

### MOTORTESTER CONVERSION

VDT-I-Gen. 032 En  
6.80

Incorrect display of rotational speed,  
dwell angle and ignition point  
only with trigger boxes  
0 227 100 ... (TCI-i, TCI-h) with current  
limitation

For additional information see VDT-I-Gen. 030 of 6.80

Re.: Motortester EFAW 268  
268 S 10  
269  
214 B  
AE 2000

#### 1. General

Please make sure that the above-mentioned motortesters in your workshop and at your customers (e.g. motor vehicle workshops, oil companies, gas stations, vocational schools etc.) are converted. The conversion is subject to payment and is carried out by the K7 after-sales service of the responsible BG. The standard time is 15 work units (with fitting of switch).

#### 2. Why motortester conversion?

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle as well as to incorrect triggering of the meter when testing the ignition system. There is, however, no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Since, with the above-listed motortesters, the timing light is triggered by the signal path dwell angle - meter, this incorrect triggering also leads to incorrect flashing and thus to an incorrect display of the advance angle.

#### 3. Conversion measures

The situation is to be remedied by modifying the wiring of the testers so that the timing light is triggered by the clamp-on induction pickup and the pulse shaper stage.

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**N10**

Motor Vehicle Service Information  
Porsche







#### 4. Test instructions

##### 4.1 Standard ignition systems

Switch position: "standard"

All other tester connections as per operating instructions.

##### 4.2 Ignition systems with current limitation

Switch position: "current limitation"

In order to trigger the timing light, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

TESTS ON ELECTRONIC IGNITION SYSTEMS  
(TCI, TZ)  
TESTER INSTRUCTIONS

VDT-I-Gen. 035 En  
3.1981

The following tests are listed in older and current Tester operating instructions or in Trouble-shooting with the oscillograph:

- "Separate ignition coil test" (concerns EFAW 213, 214, 268, AE 2000).
- Calculating the "ignition voltage reserve" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).
- "Intensified insulation test" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7-Information K7-VJF 17/8012.

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**N13**

Motor Vehicle Service Information  
Porsche



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